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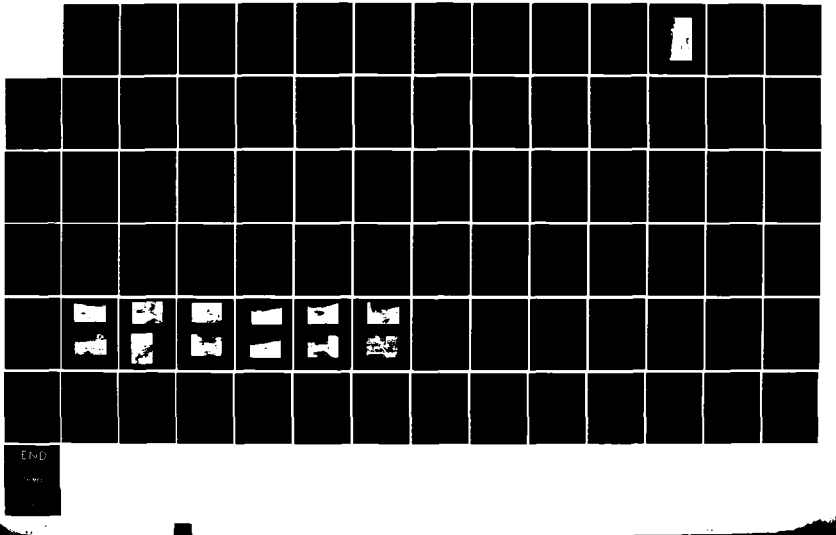
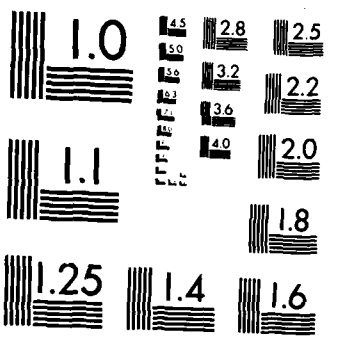


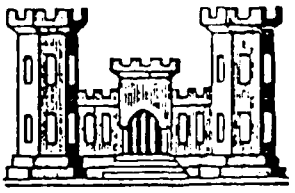


CONNECTICUT RIVER BASIN
SHELBURNE FALLS, MASSACHUSETTS

ALBERT DAVENPORT DAM

MA 00507

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

MARCH 1981

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER MA 00507	2. GOVT ACCESSION NO. AD-A154765	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Albert Davenport Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
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18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,
Connecticut River Basin
Sherburne Falls, Massachusetts
Mechanic Street Brook

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam is an earth embankment approximately 330 feet long with a maximum height of 10 feet. The drainage area is 0.64 square miles. The dam is small in size and has a significant hazard potential. The dam appears to be in poor condition. Seepage is evident all along the downstream toe. The owner should implement various operation and maintenance procedures.

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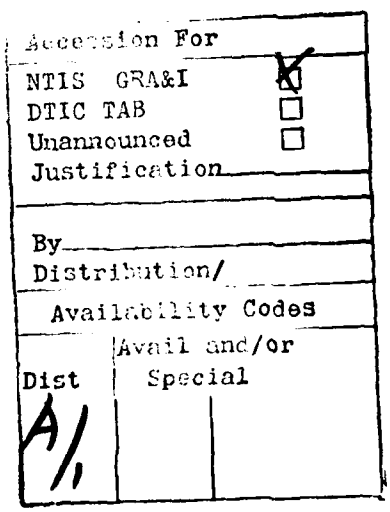
ALBERT DAVENPORT DAM
MA 00507

ALBERT DAVENPORT POND
SHELBURNE FALLS, MASSACHUSETTS



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification Number:	MA 00507
Name of Dam:	Albert Davenport Dam
Town:	Shelburne Falls
County and State:	Franklin, Massachusette
Stream:	Mechanic Street Brook
Date of Inspection:	December 2, 1980

BRIEF ASSESSMENT

Albert Davenport Dam is an earth embankment approximately 330 feet long with a maximum height of 10 feet. The upstream and downstream slopes of the embankment are about 1H:1V. The crest of the dam is 12 feet wide. The spillway is located adjacent to the right abutment and consists of a three-foot deep swale with an approximately eight-foot wide invert. According to the Owner, the dam was built before 1900 for recreational activities and fire protection.

Albert Davenport Dam has a drainage area of 0.64 square miles. The maximum storage capacity of 50 acre-feet, along with the maximum height of 10 feet places the dam in the "Small" size category. A breach of the dam with the reservoir surface at the top of the dam would cause appreciable property damage with little chance for loss of life at the downstream damage center. Therefore, the dam is classified in the "Significant" hazard potential category. The recommended test flood for a "Small" size, "Significant" hazard dam is from the 100 year flood to one-half of the Probable Maximum Flood (PMF). Due to the potential for appreciable property damage, the selected test flood is one-half of the PMF.

The peak test flood inflow for Albert Davenport Dam is 710 cfs. The routed test flood outflow of 710 cfs overtops the dam by about 0.9 feet. The spillway is capable of discharging 60 cfs or about 9 percent of the routed test flood outflow prior to overtopping of the dam.

The dam appears to be in poor condition. Seepage is evident all along the downstream toe. Trees and heavy brush cover the entire dam except for a foot path along the center of the crest.

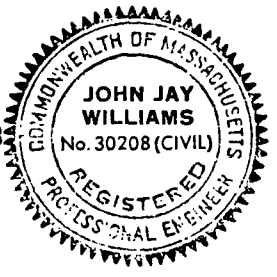
Within one year after receipt of this Phase I Inspection Report, the Owner, Mr. Albert Davenport, should retain the services of a qualified, registered professional engineer experienced in the design and construction of dams for the following purposes: 1) perform detailed hydrologic and hydraulic analyses to assess the need for increasing the project discharge capacity and to evaluate the ability of the structure to withstand overtopping; 2) investigate the source and extent of the seepage observed along the entire downstream toe of the dam; and 3) direct the removal of trees and their root systems from the embankment and to 20 feet from the downstream embankment toe and direct the backfilling of any voids with suitable, thoroughly compacted materials.

The Owner should also implement the following operation and maintenance procedures: 1) remove brush from the embankment and backfill any remaining voids with suitable, thoroughly compacted materials; 2) repair and operate periodically the reservoir drain control valve; 3) construct the spillway outlet channel; 4) provide embankment protection on the upstream face of the dam; 5) institute a program of annual periodic technical inspection; 6) establish a regular maintenance program; 7) develop a maintenance system and a flood warning plan which would be implemented during heavy precipitation.

O'BRIEN & GERE ENGINEERS, INC.

John J. Williams

John J. Williams, P.E.
Vice President
Massachusetts Registration No. 30208



Date: 3 March 81

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation: however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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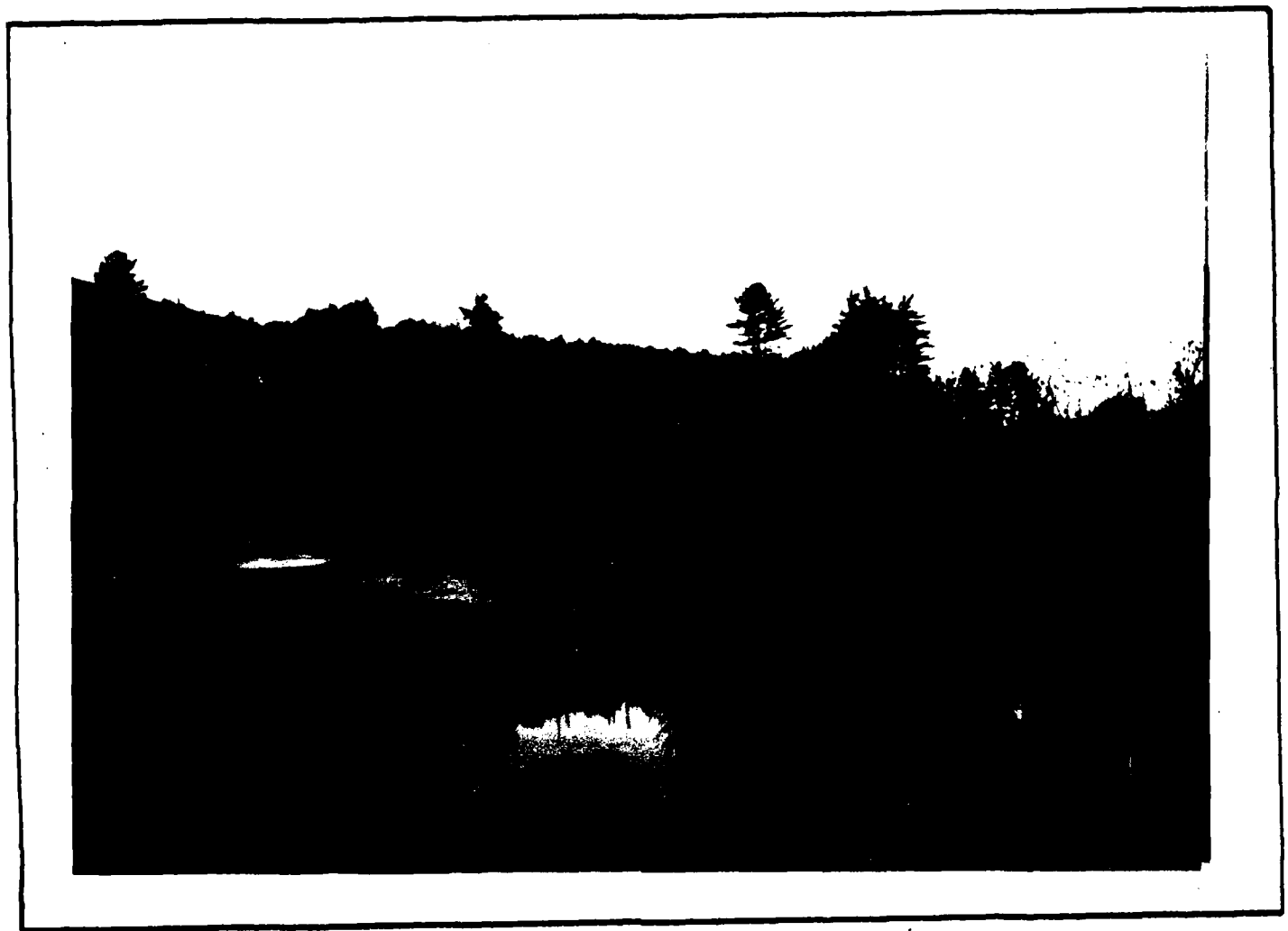
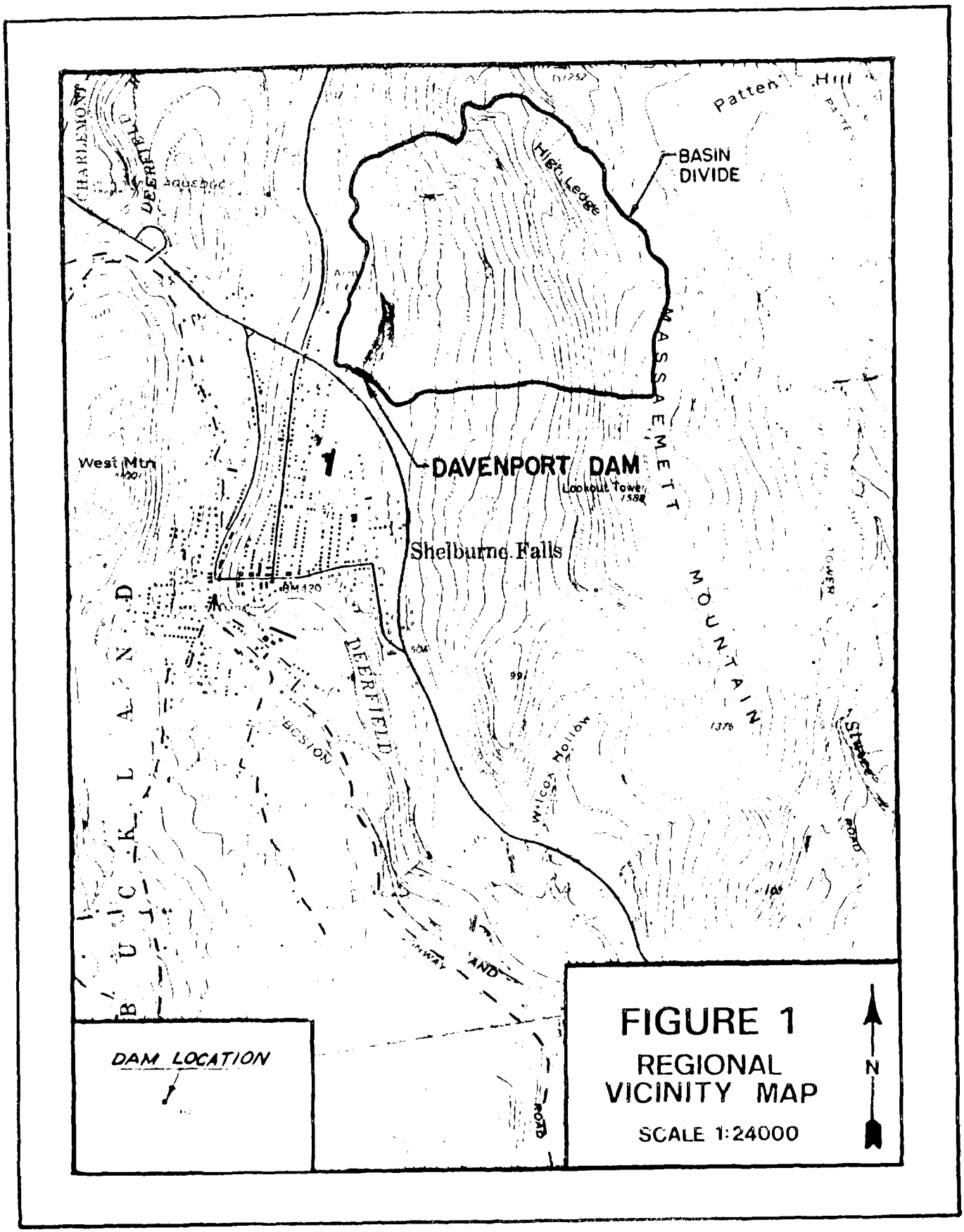


OVERVIEW OF DAM FROM THE UPSTREAM RIGHT ABUTMENT (12/2/80)


BASIN DIVIDE
High Ledge
DAVENPORT DAM
Lookout Tower
Shelburne Falls
West Mtn
MASSAEMETT MOUNTAIN
BUCKLAND
DEERFIELD
BOSTON
ROAD
DAM LOCATION
FIGURE 1
REGIONAL VICINITY MAP
SCALE 1:24000
N

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority. The National Dam Inspection Act (Public Law 92-367) was passed by Congress on August 8, 1972. Under this Act the Secretary of the Army was authorized to initiate, through the Corps of Engineers, the National Program for Inspection of Dams throughout the United States. Responsibility for supervising inspection of dams in the New England Region has been assigned to the New England Division of the Army Corps of Engineers.

O'Brien & Gere Engineers, Inc. has been retained by the New England Division to inspect and report on selected non-federal dams in the Commonwealth of Massachusetts. Authorization and Notice to Proceed were issued to O'Brien & Gere Engineers, Inc. by a letter dated November 12, 1980 and signed by Col William E. Hodgson, Jr. Contract No. DACW33-81-C-0016 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection. The purpose of inspecting and evaluating non-federal dams is to:

1. Identify conditions which threaten public safety and make the Owner aware of any deficiencies so that he may correct them in a timely manner.

2. Encourage and prepare the state to initiate an effective dam safety program for non-federal dams as soon as possible.

3. Update, verify and complete the National Inventory of Dams.

1.2 Description of Project (Information with regard to this dam was obtained from the Owner, Albert Davenport and from the Commonwealth of Massachusetts, Department of Environmental Quality Engineering (DEQE)).

a. Location. Albert Davenport Dam is located on Mechanic Street Brook in the town of Shelburne Falls. A portion of the USGS Quadrangle map entitled "Shelburne Falls", Massachusetts has been included as Figure 1 on page vi of this report to illustrate the location. USGS reference coordinates for this dam are N42^{O}36.7' and W72^{O}43.9'.

Water from the Albert Davenport Dam impoundment discharges into Mechanic Street Brook. About 150 feet downstream of the dam the brook passes under a dirt road through a 54-inch diameter steel pipe, 50 feet further downstream it flows under Mass Route 2 in an 8-foot high by 7-foot wide concrete box culvert, approximately 1,000 feet further downstream it flows under Mechanic Street in Shelburne Falls in an 8-foot wide by 4-foot high concrete box culvert. The flow is conveyed about 600 feet in the box culvert before it discharges into the Deerfield

VISUAL INSPECTION CHECK LIST

Project: ALBERT DAVENPORT DAM

National I.D. #: MA. 00507

Date(s): DECEMBER 2, 1980

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	448.0 ±
Current Pool Elevation	445.0 ±
Maximum Impoundment to Date	UNKNOWN
Surface Cracks	NONE OBSERVED
Pavement Condition	UNPAVED
Movement or Settlement of Crest	NONE OBSERVED
Lateral Movement	NONE OBSERVED
Vertical Alignment	NO VERTICAL MISALIGNMENT OBSERVED
Horizontal Alignment	NO HORIZONTAL MISALIGNMENT OBSERVED
Condition at Abutment ~~and at Concrete Structures~~	Satisfactory, no settlement or erosion observed.
Indications of Movements of Structural Items on Slopes	NOT APPLICABLE
Trespassing on Slopes	Path to bare earth for full length of dam crest
Vegetation on Slopes	Several trees under 12" diam. and many bushes and uncut grass upstream and downstream slopes
Sloughing or Erosion of Slopes or Abutments	No sign of erosion upstream and downstream slopes
Rock Slope Protection - Riprap Failures	Few random rock observed

VISUAL INSPECTION CHECK LIST

INSPECTION TEAM ORGANIZATION

Project: ALBERT DAVENPORT DAM

National I.D.#: MA 00507

Location: Town of Shelburne Falls, MA

Type of Dam: EARTH FILL

Inspection Date(s): December 2, 1980

Weather: Overcast Cool ≈35°F

Pool Elevation: 445± MSL

Inspection Team

Lee DeHeer	O'Brien & Gere	Managing Engineer
Leonard Beck	O'Brien & Gere	Structures
Steven Snider	O'Brien & Gere	Foundations & Materials
Alan Hanscom	O'Brien & Gere	Structures
Denis Mehu	Bryant Associates, Inc.	Hydrology/Hydraulics

Owner's Representative

Albert Davenport, Owner

105 Mechanic St., Shelburne Falls, MA 01370

APPENDIX A

INSPECTION CHECKLIST

5. Institute a program of annual periodic technical inspection.

6. Establish a regular maintenance program in conjunction with the technical inspection.

7. Develop a monitoring system and a flood warning plan, which would be implemented during heavy precipitation.

7.4 Alternatives

No other alternatives appear advisable for this structure.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. Based upon the visual inspection of the site on December 2, 1980, the dam appears to be in poor condition. The deficiencies are described in Section 3.1 and in Section 6.1. Recommendations and remedial measures are discussed in Section 7.2 and 7.3.

b. Adequacy of Information. No design information or records are available from the Owner. However, the information obtained during the field investigation and from DEQE files is considered adequate for a Phase I evaluation.

c. Urgency. The recommendations and remedial measures described in this Section should be implemented within one year of receipt of this Phase I Inspection Report.

7.2 Recommendations

The Owner should retain the services of a qualified, registered professional engineer experienced in the design and construction of dams for the following purposes:

1. Perform detailed hydrologic and hydraulic analyses to assess the need for increasing the project discharge capacity and evaluate the ability of the structure to withstand overtopping.

2. Investigate the source and extent of the seepage observed along the entire downstream toe of the dam.

3. Direct the removal of trees and their root systems from the embankment and to 20 feet from the downstream embankment toe. Direct the backfilling of any remaining voids with suitable compacted material.

7.3 Remedial Measures

The Owner should also implement the following operation and maintenance procedures:

1. Remove brush from the embankment. Resulting voids should be backfilled with suitable thoroughly compacted material.

2. Repair the control valve for the reservoir drain. The operability of this valve should be checked on an annual basis.

3. Construct the spillway outlet channel.

4. Provide embankment protection on the upstream face of the dam.

SECTION 6

EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations

The dam appears to be in poor condition. The entire embankment is covered with trees and heavy brush except for a foot path along the centerline of the crest. Clear seepage (20 gpm) is evident along the entire downstream toe of the dam. The roots of trees and bushes could create seepage paths through the embankment and portions of the embankment could be damaged it trees were uprooted during high winds.

6.2 Design and Construction Data

According to the Owner, no design or construction information is available for the dam.

6.3 Post Construction Changes

The dam was rebuilt to its present configuration in 1941. According to the Owner, no information is available relative to the rebuilding.

6.4 Seismic Stability

Albert Davenport Dam is located in Seismic Zone 2 on the "Seismic Zone Map of Contiguous States". Therefore, according to the Recommended Guidelines for Phase I Dam Inspections, the dam need not be evaluated for seismic stability.

the reservoir surface at the top of the dam with no failure. The resulting outflow was routed to the damage center which was assumed to be 2 houses and an athletic field about 1,200 feet downstream of the dam and just upstream of Mechanic Street. The channel cross-section at this location is shown on Page D-7. The routing of the flood was restricted by the 8-foot high by 7-foot wide culvert under Mass. Route 2. The area between Route 2 and the dam was considered to be a holding area. No attempt was made to analyze a potential breach of the Route 2 embankment as this is beyond the scope of a Phase I investigation.

The stream depths at the damage center were computed to be 7.0 feet and 2.0 feet for the breach and non-breach conditions, respectively. The discharge for the breach condition is 1,170 cfs compared to 82 cfs for the non-breach condition. Mechanic Street would be overtopped by 0.5 feet for the breach condition which would result in basement flooding of the houses on the west side of the street (Refer to picture 10, pg. D-5). Basement flooding would also be expected in the 2 houses on the east side of Mechanic Street for the breach condition (Refer to picture 11, pg. D-6). A flood of this magnitude would cause appreciable property damage, but it is unlikely any lives would be lost.

SECTION 5

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

The drainage area for Albert Davenport Dam is 0.64 square miles. The watershed is mountainous, forested and undeveloped. The topography ranges from El. 1,450 in the upper reaches to Elevation 445 which is the normal pool elevation at the damsite.

5.2 Design Data

According to the Owner, no hydrologic or hydraulic design information is available.

5.3 Experience Data

According to the Owner, no rainfall or reservoir level records are maintained at this site.

5.4 Test Flood Analysis

The recommended test flood for a "Small" size "Significant" hazard dam is from the 100 year flood to one-half of the Probable Maximum Flood (PMF). Based upon the potential for appreciable property damage to two houses and a school athletic field located along Mechanic Brook, the selected test flood is one-half of the PMF. Hydrologic and hydraulic calculations were performed with the assistance of the HEC-1-DB computer program. The flood hydrographs were constructed from the Snyder Unit hydrographs using average coefficients, an initial infiltration of zero and a constant loss rate of 0.05 inches per hour. The Hop Brook Adjustment factor[1] was used to reduce the Probable Maximum Precipitation based upon the size of the drainage area. Stage vs. Discharge and Stage vs. Storage relationships were developed for the structure. These relationships were utilized by the program to route the test flood through the dam. The reservoir water surface was assumed to be at spillway crest elevation at the beginning of the storm event.

The peak inflow and outflow rates for the test flood at Albert Davenport Dam were computed to be 710 cfs. The peak outflow corresponds to a reservoir stage of 3.9 feet above the spillway crest, or 0.9 feet above the top of dam elevation. The spillway is capable of discharging 60 cfs or about 9 percent of the routed test flood outflow prior to overtopping of the dam.

5.5 Dam Failure Analysis

A failure of the embankment was simulated by the HEC-1-DB computer program assuming a 127 feet wide by 10 feet deep breach with vertical side slopes developing within one hour. Failure was assumed to occur with the reservoir surface at the top of the dam. This was compared with discharge through the spillway with

[1]Corps of Engineers, Engineering Circular No. 1110-2-27, Aug. '66.

SECTION 4

OPERATION AND MAINTENANCE PROCEDURES

4.1 Operational Procedures

a. General. According to the Owner, Mr. Albert Davenport, no operational procedures are followed. He also stated that the reservoir drain control valve has been inoperable for many years.

b. Description of Any Warning System in Effect. According to the Owner, there is no warning system in effect.

4.2 Maintenance Procedures

a. General. According to the Owner, no maintenance procedures are performed on a routine basis.

b. Operating Facilities. The only existing operating facility at this site is the inoperable reservoir drain control valve.

4.3 Evaluation

No operational or maintenance procedures are in effect. A regular inspection and maintenance program should be established and the reservoir drain control valve should be made operational. A monitoring system and flood warning plan should be developed and implemented when necessary.

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General. Albert Davenport Dam was inspected on December 2, 1980. At the time of the inspection, the reservoir surface was about an inch above the spillway crest. Underwater areas were not inspected.

The observations and comments of the field inspection team are in the checklist which is Appendix A of this report.

b. Dam. The dam appears to be in poor condition. The embankment slopes upstream and downstream are steep (approximately 1H:1V). The entire embankment is covered with trees and heavy brush except for a foot path along the center of the crest. Clear seepage (20 gpm) is evident all along the downstream toe of the dam.

c. Appurtenant Structures. The spillway is a swale adjacent to the west abutment. Debris consisting of rocks, branches, etc. partially blocks the spillway.

According to the Owner, the control valve for the reservoir drawdown pipe has not been operable for many years. The control valve is located on the upstream side of the embankment and is not visible from the shore line.

d. Reservoir Area. The slope of the terrain along the perimeter of the reservoir varies from nearly level to slopes as steep as 40 percent. There is no evidence of excessive siltation in the reservoir.

In case of overtopping or breaching of the dam, the area between the dam and the Massachusetts Route 2 embankment would serve as a storage area with discharge controlled by the 8-foot high by 7-foot wide Massachusetts Route 2 culvert.

e. Downstream Channel. The outlet channel flows through a marshy region for about 150 feet before discharging through a 54-inch diameter steel pipe constructed under a dirt road. Approximately 50 feet further downstream the discharge flows through a 7-foot wide by 8-foot high culvert under Mass. Route 2. The brook flows an additional 1,000 feet before entering a culvert 8 feet wide by 4 feet high under Mechanic Street. The culvert conveys discharge 600 feet further before outleting into the Deerfield River.

3.2 Evaluation

Based upon visual inspection, the dam is considered to be in poor condition. Clear seepage (20 gpm) is evident all along the downstream toe. The entire embankment is covered with trees and heavy brush except for a foot path along the center of the crest. The inoperable control valve in the reservoir drain pipe prohibits drawdown of the reservoir in the event of an emergency.

SECTION 2

ENGINEERING DATA

2.1 Design

According to Mr. Albert Davenport, the Owner, no design information is available for the dam.

2.2 Construction

According to the Owner, no information concerning the construction of Albert Davenport Dam is available.

2.3 Operation

According to the Owner, no operating procedures for the dam have been established. The 24-inch diameter outlet pipe was to provide for emergency drawdown of the reservoir; however, the control valve for the outlet pipe has been inoperable for many years.

2.4 Evaluation

a. Availability. Information was obtained from the Department of Environmental Quality Engineering (DEQE) and the Owner.

b. Adequacy. Sufficient information was obtained during the field investigation and from DEQE files to conduct a Phase I dam evaluation.

c. Validity. Information obtained from DEQE generally agrees with data acquired during the field investigation.

e. Storage. (Acre-Feet)

1.	Normal Pool	20
2.	Flood Control Pool	N/A
3.	Spillway Crest Pool	20
4.	Top of Dam Pool	50
5.	Test Flood Pool	61

f. Reservoir Surface Area. (Acres)

1.	Normal Pool	8
2.	Flood Control Pool	N/A
3.	Spillway Crest Pool	8
4.	Top of Dam Pool	10
5.	Test Flood Pool	14

g. Dam Data

1.	Type	Earth Embankment
2.	Length	±330 feet
3.	Height	10 feet
4.	Top Width	12 feet
5.	Side Slopes (Upstream)	1H:1V
	(Downstream)	1H:1V
6.	Zoning	Unknown
7.	Impervious Core	Unknown
8.	Cutoff	Unknown
9.	Grout Curtain	Unknown

h. Diversion and Regulating Tunnel — N/A

i. Spillway

1.	Type	Swale unpaved channel
2.	Length of Weir	±8 feet
3.	Crest Elevation	±445 feet
4.	Gates	None
5.	Upstream Channel	Impoundment
6.	Downstream Channel	A trapezoidally shaped channel about 5 feet wide with approximately 1:1 side slopes and approximately 3 feet deep.

j. Regulating Outlet

1.	Invert Elevation	±438
2.	Size	24-inch diameter
3.	Description	Refer to Section 1.3.b.1
4.	Control Mechanism	Refer to Section 1.3.b.1

1.3 Pertinent Data

a. Drainage Area. The drainage area above Albert Davenport Dam is 0.64 square mile. The entire area is undeveloped with most of it forest covered. The topography is mountainous ranging from El. 1,450 to El. 445 at the normal pool.

b. Discharge at Damsite.

1. Outlet Works. The outlet works consist of a 24-inch metal pipe with an inoperable control valve in the reservoir. According to the Owner, the valve has not been operable for many years. The invert of the outlet of the pipe is at approximately El. 438.

2. Maximum Known Flood. According to the Owner, no recorded flood data is available for this site.

3. Ungated Spillway Capacity at Top of Dam. The ungated spillway capacity at top of dam El. 448 at 60 cfs.

4. Ungated Spillway Capacity at Test Flood Elevation. The ungated spillway capacity at test flood El. 448.8 is about 90 cfs.

5. Gated Spillway Capacity at Normal Pool Elevation. N/A

6. Gated Spillway Capacity at Test Flood Elevation. N/A

7. Total Spillway Capacity at Test Flood Elevation. The ungated spillway capacity at test flood El. 448.8 is about 90 cfs.

8. Total Project Discharge at Top of Dam. The ungated spillway capacity at top of dam El. 448 is 60 cfs.

9. Total Project Discharge at Test Flood Elevation. The total project discharge at test flood El. 448.8 is 710 cfs.

c. Elevation (NGVD).

1.	Streambed at Toe of Dam	±438
2.	Bottom of Cutoff	Unknown
3.	Maximum Tailwater	Unknown
4.	Recreation Pool	N/A
5.	Full Flood Control Pool	N/A
6.	Spillway Crest	445
7.	Design Surcharge (Original Design)	N/A
8.	Top of Dam	448
9.	Test Flood Surcharge	448.8

d. Reservoir Length. (Feet)

1.	Normal Pool	±1,350
2.	Flood Control Pool	N/A
3.	Spillway Crest Pool	±1,350
4.	Top of Dam Pool	±2,100
5.	Test Flood Pool	±2,150

River. The hazard area consists of two houses and a school athletic field approximately 1,200 feet downstream of the dam.

b. Description of Dam and Appurtenances. Albert Davenport Dam is an earth embankment approximately 330 feet long with a maximum height of about 10 feet. Upstream and downstream slopes of the dam embankment average about 1H:1V. The crest of the dam is relatively uniform with a width of about 12 feet.

The spillway is a swale adjacent to the west abutment with a bottom width of approximately 8 feet, three feet below the top of the dam. The outlet channel from the spillway averages 3 feet in depth, has a bottom width of about 5 feet and side slopes averaging 1H:1V.

A 24-inch diameter low level outlet metal pipe is located about 190 feet from the east abutment. The intake valve is located on the upstream side of the dam. According to the Owner, the valve was intended to be used for emergency drawdown of the reservoir. It has not been operable for many years.

c. Size Classification. Albert Davenport Dam has a maximum height of approximately 10 feet which places it in the "Small" size category because it is less than 40 feet high. It also falls into the "Small" size category for storage since its maximum storage capacity is about 50 acre feet which is less than the 1,000 acre-feet upper limit for "Small" size dams.

d. Hazard Classification. The flood impact area consists of a school athletic field and 2 houses located about 1,200 feet downstream of the dam. The breach analysis indicates that the failure of the dam with the reservoir surface at the top of the dam would result in basement flooding of the two houses in the hazard area. Basement flooding would also occur in the houses downstream of Mechanic Street. Appreciable property damage could result with little or no chance for loss of life. Albert Davenport Dam is therefore classified as a "Significant" hazard structure.

e. Ownership. The dam is owned by Mr. Albert Davenport, Shelburne Falls, Massachusetts. He may be contacted at 105 Mechanic Street, Shelburne Falls, MA 01370. Telephone: (413) 625-2066.

f. Operator. Owner.

g. Purpose of Dam. According to the Owner, the dam was originally constructed and still is used for recreational purposes and fire protection.

h. Design and Construction History. According to the Owner, the original dam was built before 1900. The dam was reconstructed in 1941. According to the Owner, no plans relative to the original or rebuilt dams are available.

i. Normal Operating Procedures. According to the Owner, no operating procedures are in effect at the dam.

VISUAL INSPECTION CHECK LIST

Project: ALBERT DAVENPORT DAM

National I.D. #: MA. 00507

Date(s): DECEMBER 2, 1980

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT (Con't)	
Unusual Movement or Cracking at or near Toes	NONE OBSERVED
Unusual Embankment or Downstream Seepage	Seepage is observed between left abutment and 24 INCH Diam. Concrete Pipe. Also from right abut. to 24" ϕ Con'C Pi
Piping or Boils	NONE OBSERVED
Foundation Drainage Features	NONE OBSERVED
Toe Drains	NONE OBSERVED
Instrumentation System	NOT APPLICABLE

VISUAL INSPECTION CHECK LIST

Project: ALBERT DAVENPORT DAM

National I.D. #: MA, 00507

Date(s): DECEMBER 2, 1980

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	poor
Loose Rock Overhanging Channel	none
Trees Overhanging Channel	heavy brush obstructs channel
Floor of Approach Channel	boulder, brush & trash strewn
b. Weir and Training Walls	
General Condition of Concrete	N/A
Rust or Staining	N/A
Spalling	N/A
Any Visible Reinforcing	N/A
Any Seepage or Efflorescence	N/A
Drain Holes	N/A
c. Discharge Channel	
General Condition	Poor Condition

weir section very poorly defined with boulders, brush & trash strewn over the entire area.

VISUAL INSPECTION CHECK LIST

Project: ALBERT DAVENPORT DAM

National I.D. #: MA, 00507

Date(s): DECEMBER 2, 1980

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS (Con't)	
Loose Rock Overhanging Channel	NONE OBSERVED
Trees Overhanging Channel	NONE OBSERVED
Floor of Channel	Boulder, brush & trash stream
Other Obstructions	None other than what is stated above.

VISUAL INSPECTION CHECK LIST

Project: Albert Davenport Dam

National I.D. #: MA 00507

Date(s): December 2, 1980

AREA EVALUATED	CONDITIONS
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	The intake channel is actually the pond which could have surface trash obstructing the inlet to the intake structure. At the time of the inspection, no surface trash was observed on the pond.
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	C.M Pipe which appears to be in satisfactory condition
Stop Logs and Slots	

VISUAL INSPECTION CHECK LIST

Project: Albert Davenport Dam

National I.D. #: MA 00507

Date(s): December 2, 1980

AREA EVALUATED	CONDITIONS
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	Conduit is a 24" ϕ C.M. pipe which appears to be in satisfactory condition
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

VISUAL INSPECTION CHECK LIST

Project: Albert Davenport Dam

National I.D. #: MA 00507

Date(s): December 2, 1980

AREA EVALUATED	CONDITIONS
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	Outlet structure is a plunge pool excavated by discharge from the 24" ϕ C.M. pipe. The plunge pool is ill defined and brush clogged.
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain Holes	
Channel	The outlet channel is meandering and brush obstructed.
Loose Rock or Trees Overhanging Channel	
Condition of Discharge Channel	

APPENDIX B

ENGINEERING DATA

ALBERT DAVENPORT DAM

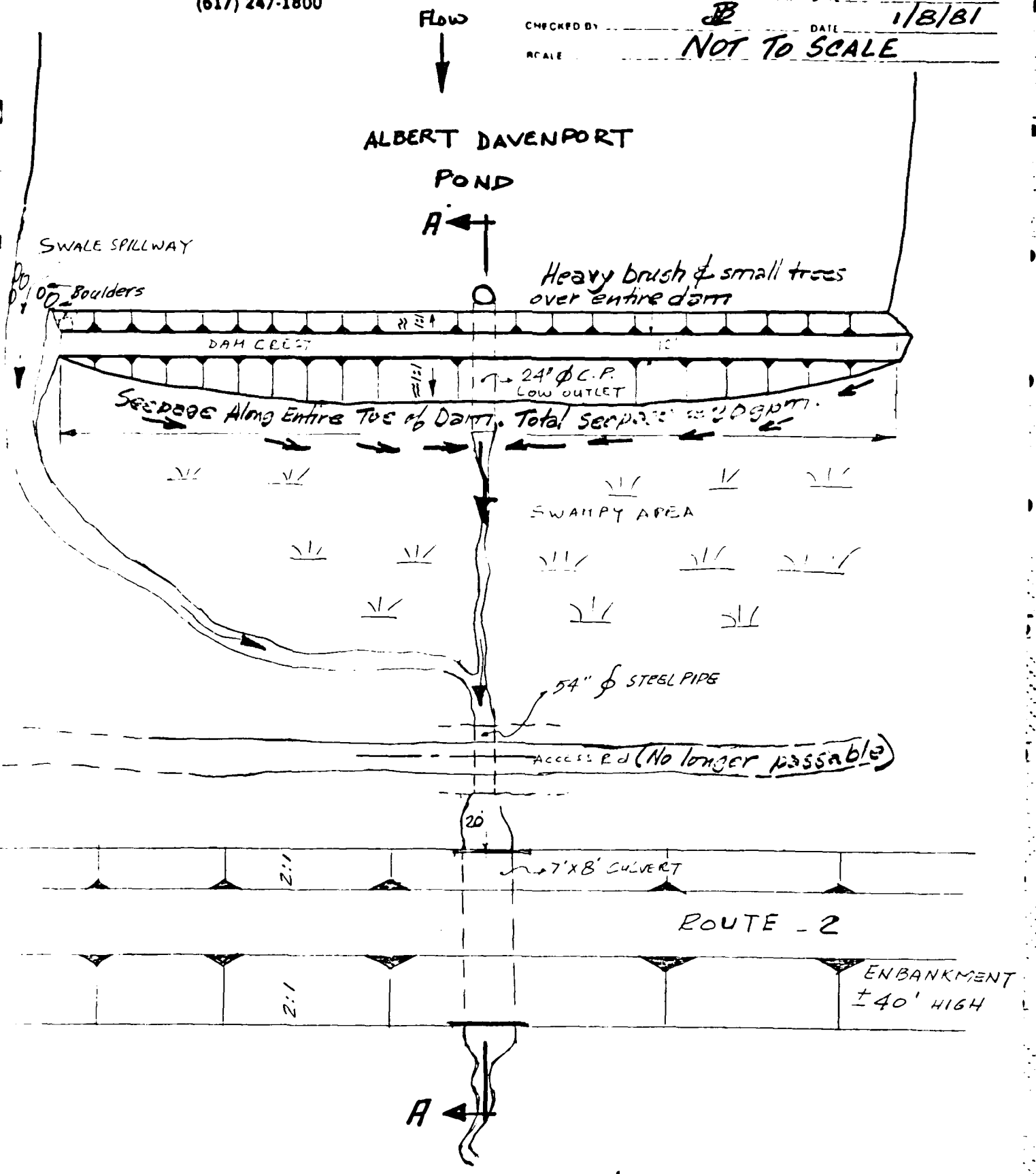
APPENDIX B

ENGINEERING DATA

TABLE OF CONTENTS

BRYANT ASSOCIATES, INC.
648 Beacon Street
BOSTON, MASSACHUSETTS 02215
(617) 247-1800

JOB 2000 002
SHEET NO B-1 OF
CALCULATED BY D.M. DATE 12/10/80
CHECKED BY DB DATE 1/8/81
SCALE NOT TO SCALE



PLAN VIEW DAM SITE &
SURROUNDING AREA

BRYANT ASSOCIATES, INC.
648 Beacon Street
BOSTON, MASSACHUSETTS 02215
(617) 247-1800

JOB 2060-002
SHEET NO 2 OF
CALCULATED BY DM DATE 12/10/80
CHECKED BY DB DATE 1/8/81
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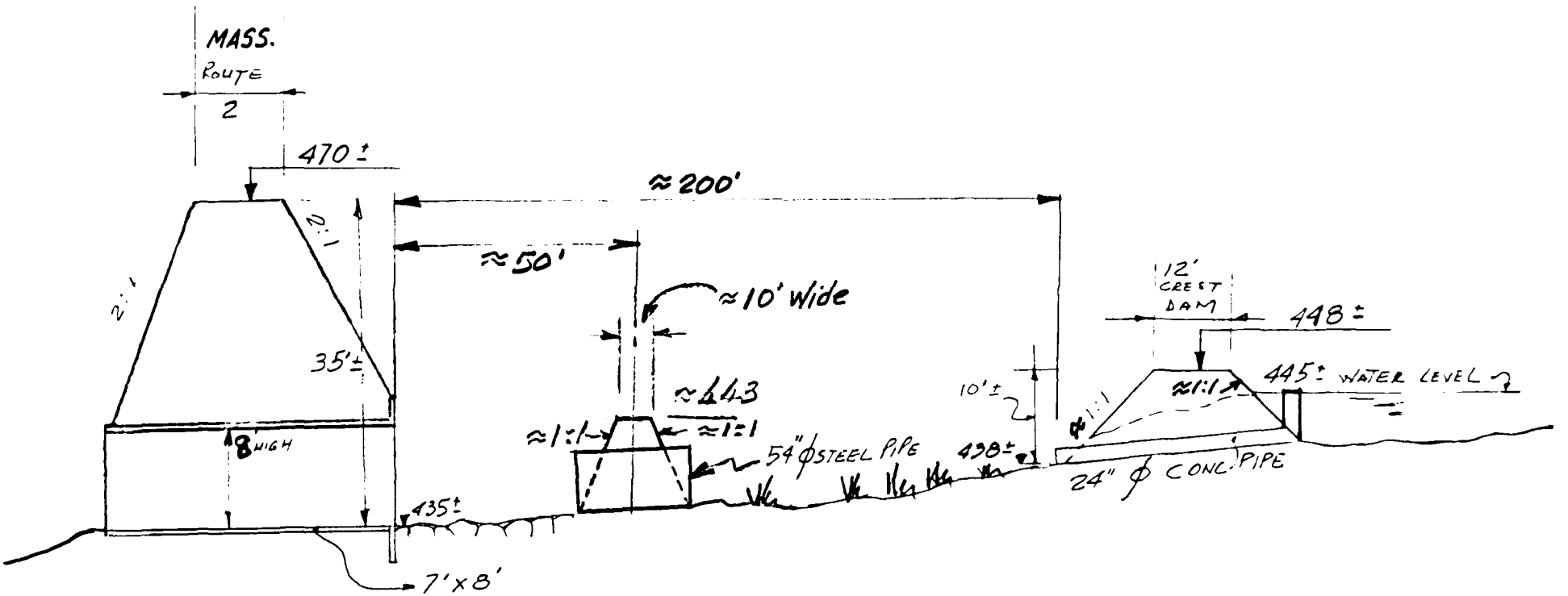

SECTION A-A

BRYANT ASSOCIATES, INC.
648 Beacon Street
BOSTON, MASSACHUSETTS 02215
(617) 247-1800

SHEET NO. B-3 OF
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CHECKED BY [illegible] DATE 1/8/81
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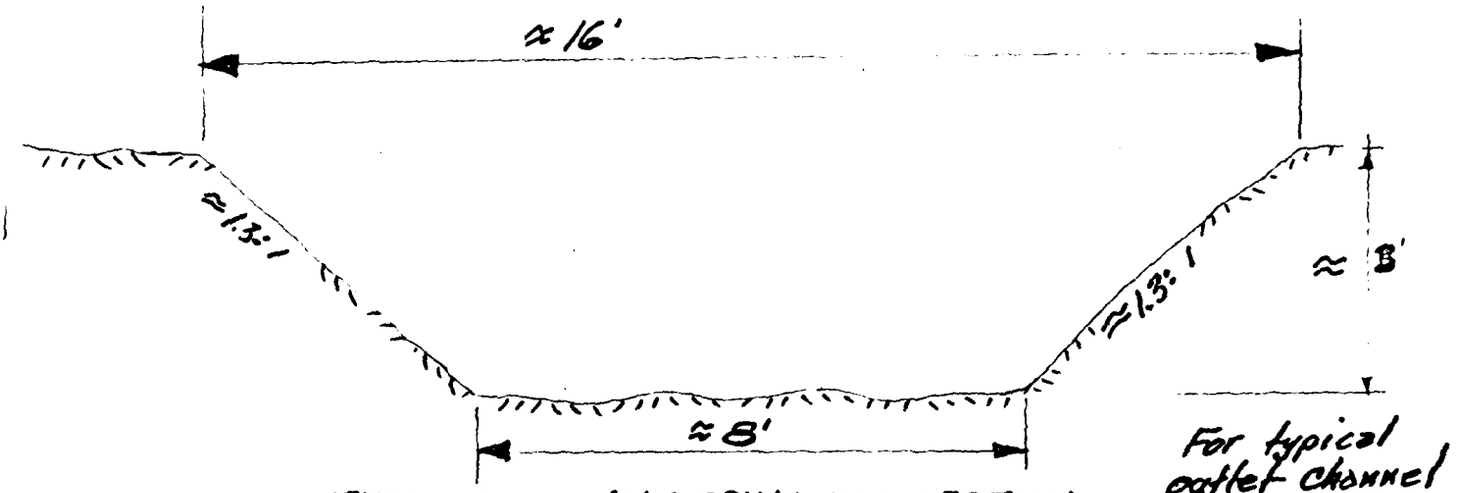
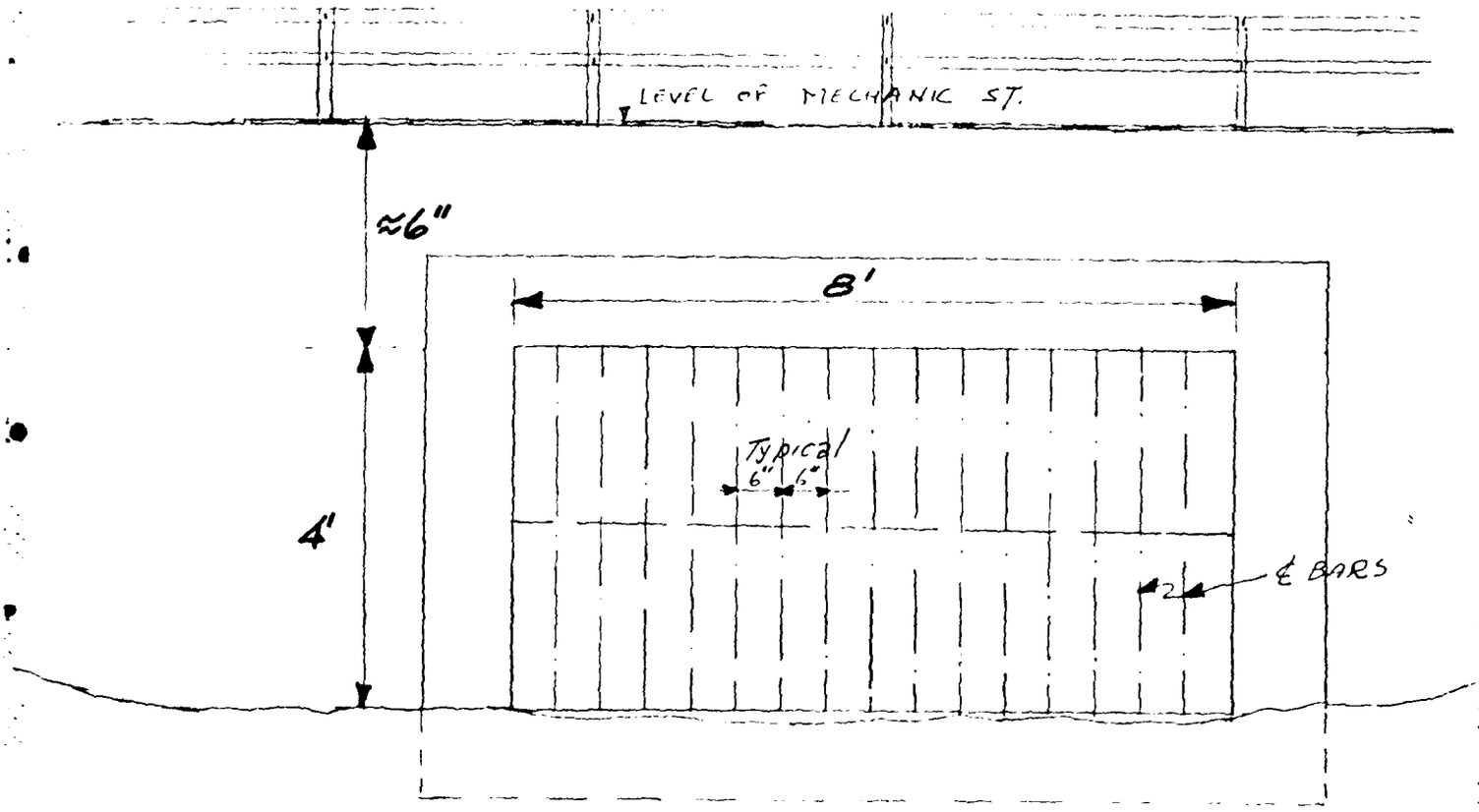


For typical outlet channel see

TYPICAL SWALE SPILLWAY SECTION @ ℄ DAM



ENTRANCE TO BOX CULVERT AT MECHANIC ST.

DESCRIPTION OF DAM

DISTRICT 2

Submitted by R. C. Salls, P.E. Dam No. 2-6-268-4

Date July 21, 1972 City/Town Shelburne

Name of Dam Albert Davenport

1. Location: Topo Sheet No. 10C Mass. Rect. Coordinates N 599,800 E 268,000

Provide 8½" x 11" in clear copy of topo map with location of Dam clearly indicated.
On Mechanic St. Brook 200 Ft. North of Rte. 2 (Mohawk Trail) about 500 Ft. east of Junction with Mechanic St.

2. Year built: 1941 Year/s of subsequent repairs -- Needs Repair

3. Purpose of Dam: Water Supply ____ Recreational X
Irrigation ____ Other Fire Protection

4. Drainage Area: one-half sq. mi. ____ acres.

5. Normal Ponding Area: 8¼ Acres; Ave. Depth 4
Impoundment: 10.7 Million gals; 33 acre ft.

6. No. and type of dwellings located adjacent to pond or reservoir None
i.e. summer homes etc. Two dwellings about 300 Ft. away.

7. Dimensions of Dam: Length 300' Max. Height 10'
Freeboard 3'
Slopes: Upstream Face 1½ : 1
Downstream Face 1½ : 1
Width across top 10'±

B-4

DAM NO. 2-6-268-4

8.

Classification of Dam by Material:

Earth X Conc. Masonry _____ Stone Masonry _____

Timber _____ Rockfill _____ Other _____

No Core Wall

9.

A. Description of present land usage downstream of dam:

40 % rural; 60 % urban

B. Is there a storage area or flood plain downstream of dam which could accommodate the impoundment in the event of a complete dam failure. yes _____ no X

10.

Risk to life and property in event of complete failure.

No. of people 30+

No. of homes 30+

No. of businesses 10+

No. of industries None Type _____

No. of utilities 3 Type Electrical Pole Lines, Telephone Lines, Water Lines

Railroads No

Other dams No

Other Mechanic St. Brook enters Culvert at Mechanic St. and is diverted to River.

11.

Attach Sketch of dam to this form showing section and plan on 8½" x 11" sheet.

RCS/sd/agm
Att. 2

DAM INSPECTION REPORT

Inspected by R. C. Salls, P.E. Date July 21, 1972

Date Last Inspection --

Town Shelburne County Franklin Dam No. 2-6-268-4

Name of Dam Albert Davenport USGS ID# 10C Mass. Rect. Coordinate N 599,800 E 268,000

Sketch See Description of Dam Picture Available No Plans, Where --

Owner Representative Notified Date July 21, 1972 By Letter - Tel. X

Owner Representative Mrs. Kelly (Owner's Daughter) Present Yes X No

Owner Albert Davenport
Mechanic St.
Shelburne Falls, Mass.

Per Town Assessors ____ As of
Reg. of Deeds ____ July 21, 1972
Previous Insp. ____ ____
Personal Contact ____

STRUCTURAL DATA

DAM TYPE: Gravity Embankment Straight X Curved ____ Arched ____ Other ____

DAM MATERIAL: Earth X Conc.Mas. ____ Stone Mas. ____ Steel ____ Timber ____
Rock Fill ____

DAM DIMENSIONS: Length 300 Ft. Height 10 Ft. Widths, Top 10 Ft.
Base 40 Ft.

Slope Downstream Face 1½ to 1 Slope Upstream Face 1½ to 1

Freeboard Normal 3' Ft. Depth Water at Dam 6 - 7 Ft.

DAM FACE UPSTREAM: Turf ____ Brush & Trees X Rock Fill ____ Masonry ____

Wood ____ Other ____

Condition: 1. Good ____ 2. Needs Minor Repairs ____
3. Needs Major Repairs X
4. Urgent Needs Repairs for Safety ____

DAM FACE DOWNSTREAM: Turf ____ Brush & Trees X Rock Fill ____ Masonry ____

Wood ____ Other ____

Condition: 1. Good ____ 2. Needs Minor Repairs ____
3. Needs Major Repairs X
4. Urgent Needs Repairs for Safety

B-6

APPENDIX C
SELECTED PHOTOGRAPHS OF THE PROJECT

APPENDIX C

PHOTOGRAPHS

OVERALL CONDITION:

1. Safe_____.
2. Minor repairs needed X.
3. Conditionally safe - major repairs needed_____.
4. Unsafe_____.
5. Reservoir impoundment no longer exists (explain)

   Recommend removal from inspection list_____.

REMARKS AND RECOMMENDATIONS: (Fully Explain)

Mr. Albert Davenport, owner of this dam, was present during this inspection. has had considerable repair work done on this structure since last inspection 10-21-75 - top and slopes of embankment have been regraded in many areas and ignment of upstream slope is much improved. The brush and tree growth noted last inspection has been cut and only a minor bramble growth and some minor ush growth of this past summer is now evident. There is no evidence of beaver tivity in this dam but the "Audubon Society Dam", so called, which is a large aver dam, has been rebuilt by a colony of beaver some time in the past two ars and now impounds well over a million gallons of water. Seepage problems e still evident along toe of Dam No. 2-6-268-4, but this seepage condition pears to be stabilized and of no immediate threat to the safety of the dam.

Due to the improvements made to the dam in the past two years and the parently greatly improved maintenance program being implemented by the owner, e District now rates this dam as minor repairs needed, but notes that there is need for constant surveillance of the overflow spillway and channel downstrean the owner to keep same free of debris.

S/bk

EMERGENCY SPILLWAY: Available yes, Needed ____.

Height Above Normal Water 0 Ft.

Width 25'± Ft. Height 3'± Ft. Material Earth with cobble paved inver

Condition: 1. Good X. 3. Major Repairs ____.

2. Minor Repairs ____. 4. Urgent Repairs ____.

Comments: Spillway was clear of debris and approx. 4 inchs of water was overflowing the invert on day of inspection. Invert appears to have been lowered 6"±, since last inspection.

WATER LEVEL AT TIME OF INSPECTION: 3½ ± Ft, Above ____. Below X.

Top Dam X F.L. Principal Spillway ____.

Other ____.

Normal Freeboard 3½± Ft.

SUMMARY OF DEFICIENCIES NOTED:

Growth (Trees and Brush) on Embankment Minor bramble growth on slopes.

Animal Burrows and Washouts None found.

Damage to Slopes or Top of Dam None found.

Cracked or Damaged Masonry N/A.

Evidence of Seepage Minor seepage noted in 2 areas.

Evidence of Piping None found.

Leaks None found.

Erosion None found.

Trash and/or Debris Impeding Flow None found.

Clogged or Blocked Spillway None found.

Other ____.

OUTLETS: OUTLET CONTROLS AND DRAWDOWN

No. 1 Location and Type: Center of dam - 24" diam. steel flume pipe.

Controls yes, TYPE: Steel slide gate - chain hoist.

Automatic____. Manual X. Operative Yes X, No____.

Comments: Gate has not been operated for some years per word of owner.

No. 2 Location and Type: North end of dam - swale spillway 30'±W. x 2½'H.

Controls none, Type:_____.

Automatic_____. Manual_____. Operative Yes_____, No_____.

Comments: Spillway clean and appeared to be stable.

No. 3 Location and Type: East side of swale spillway - 18" diam. C.I. pipe.

Controls none, Type:_____.

Automatic_____. Manual_____. Operative Yes_____, No_____.

Comments: This is an overflow outlet pipe - invert is 1'± above elev. of swale spillway invert.

Drawdown present Yes X, No____. Operative Yes X, No____.
Comments: See No. 1 above.

DAM UPSTREAM FACE: Slope 1½:1, Depth Water at Dam 2' to 3'.

Material: Turf X. Brush & Trees____. Rock fill____. Masonry____. Wood____.

Other_____.

Condition: 1. Good X. 3. Major Repairs_____.

2. Minor Repairs_____. 4. Urgent Repairs_____.

Comments: Slope has been regraded and brush removed since last inspection - minor bramble growth noted on slope - Top of dam has been regraded and appears stable at this time.

DAM DOWNSTREAM FACE: Slope 1½:1.

Material: Turf X. Brush & Trees____. Rock Fill____. Masonry____. Wood____.

Other_____.

Condition: 1. Good_____. 3. Major Repairs_____.

2. Minor Repairs X. 4. Urgent Repairs_____.

Comments: Minor brush and bramble growth (one year's growth) - seepage along toe of dam

B-16

INSPECTION REPORT - DAMS AND RESERVOIRS

1. LOCATION:

City/Town Shelburne. County Franklin. Dam No. 2-6-268-4.

Name of Dam Albert Davenport Dam.

Topo Sheet No. 10C. Coordinates: Mass. Rect. N 599,800, E 268,000.

Inspected by: Harold T. Shumway, On Nov.29,1977. Date Last Inspection 10-21-75

2. OWNER/S: As of Nov. 29, 1977

per: Assessors____, Reg. of Deeds____, Prev. Insp. X, Per. Contact X.

	Name	St. & No.	City/Town	State	Tel. No.
1.	Mr.Albert Davenport	105 Mechanic Street	Shelburne Falls,	Mass.	
2.					
3.					

3. CARETAKER: (if any) e.g. superintendent, plant manager, appointed by absentee owner, appointed by multi owners.

	Name	St. & No.	City/Town	State	Tel. No.
	Same as owner.				

4. DATA:

No. of Pictures Taken none. Sketches See description of Dam.

Plans, Where none located.

5. DEGREE OF HAZARD: (if dam should fail completely)*

1. Minor____. 3. Severe X.

2. Moderate____. 4. Disastrous____.

Comments: Approx. 2 to 2½ million gallons impoundment - Regional Elementary School a few hundred feet downstream.

*This rating may change as land use changes (future development).

The District therefore recommends that owner of dam be ordered to maintain a constant check of spillway conditions and to keep spillway clear of debris at all times to prevent any increase in present impoundment.

At present time of inspection, with spillway clear and operable and impoundment of dam at 2 1/2 to 3 million gallons, the District rates this dam as conditionally safe.

HTS/bk

(12.) OVERALL CONDITION:

1. Safe_____.
2. Minor repairs needed_____.
3. Conditionally safe - major repairs needed X .
4. Unsafe_____.
5. Reservoir impoundment no longer exists (explain)

   Recommend removal from inspection list_____.

(13.) REMARKS AND RECOMMENDATIONS: (Fully Explain)

This is an old earthen embankment type dam built around 1941. The structure has been a controversial subject ever since its erection. Some apparently unauthorized changes have been made to the dam's physical structure over the years and of late years beaver have become a constant problem in the area. The owner, Mr. Albert Davenport, was present during this present inspection of dam. The swale type overflow spillway has just been completely cleaned out of debris and brush and the side slopes regraded. An 18" diameter C.I. pipe is located on easterly side of swale spillway and the invert of this pipe is approx. one foot higher in elevation than invert of swale spillway. A plank stoplog of 14 inches in height is placed across invert of swale spillway during summer months at which time water flows thru 18" C.I. pipe.

Most of the brush on the upstream slope has been removed with some scattering brushes still noted. The grade and alignment of upstream slope is quite irregular due to ice and wave action and beaver activities in the area. The draw down gate and controls are dilapidated but still are operable according to owner. The downstream slope is covered with a heavy brush growth and some small trees. Several areas of slope were eroded by surface run offs and possible past overtopping of dam?

General minor seepage was noted along toe of slope but there were no large flows or leaks evident. It is still a swampy area below dam but is not as wet as in past inspections due to a better drainage system along the private road built at toe of Rte. 2 embankment.

A large beaver dam upstream known locally as the Audubon Society Dam, has been breached and no impoundment exists in it at present time. Breaching of this beaver dam has caused considerable silting in of Dam No. 2-6-268-4 until only an impoundment of 2 1/2 to 3 million gallons now exists. This covers an area of approx. 3 1/2 to 4 acres and average water depth is 2 feet ±. However, if the swale spillway were to be blocked by beaver activity at some future time, the impoundment could be increased by 5 or 6 million gallons at point of overtopping embankment. Failure of dam under these conditions would release 8 or nine millic gallons of water into area where an elementary regional school exists. The brook goes into an enclosed underground conduit in this area and it is questionable if said conduit would carry such a large flow of water without serious flooding of school grounds first.

(9.) EMERGENCY SPILLWAY: Available yes. Needed _____.

Height Above Normal Water 1/2 Ft.

Width 25 ± Ft. Height 2 1/2 ± Ft. Material swale and cobble paved invert

Condition: 1. Good _____. 3. Major Repairs _____.

2. Minor Repairs X _____. 4. Urgent Repairs _____.

Comments: This spillway has just recently been cleaned of all debris and water was flowing freely through it at time of inspection.

(10.) WATER LEVEL AT TIME OF INSPECTION: 2 1/2 Ft. Above _____. Below X _____.

Top Dam X F.L. Principal Spillway _____.

Other _____.

Normal Freeboard 3' ± Ft.

(11.) SUMMARY OF DEFICIENCIES NOTED:

Growth (Trees and Brush) on Embankment yes - Dense growth on downstream slope of brush and small trees.

Animal Burrows and Washouts none found

Damage to Slopes or Top of Dam yes - several small gullies caused by surface run off on downstream slope.

Cracked or Damaged Masonry N/A

Evidence of Seepage yes - general minor seepage along entire downstream toe.

Evidence of Piping none found

Leaks none found

Erosion yes - see damage to slopes line above.

Trash and/or Debris Impeding Flow none found

Clogged or Blocked Spillway none

Other _____.

3. There are several areas of erosion which should be filled with suitable material, properly compacted and graded.

4. General minor seepage along the toe of slope was noted; however, recent drainage construction has improved this condition. A constant check for any seepage changes should be maintained and then followed by the necessary corrective action.

It appears that your constant check of debris buildup at the spillway is necessary. A copy of this letter is being forwarded to the Division of Fisheries and Wildlife so that they may trap and relocate the beaver. The elementary regional school located downstream increases the hazard potential.

We call these conditions to your attention, before they become serious and more expensive to correct. With any correspondence, please include the number of the dam as indicated above.

Very truly yours,

ROBERT T. TIERNEY, P.E.
Chief Engineer

EHM
XLT
LRA:jmp
cc: Colton Bridges, Director
Div. of Fisheries and Wildlife
F. J. Hoey
R. Sills

B-11

November 24, 1975

Mr. Albert Davenport
105 Mechanic Street
Shelburne Falls, Massachusetts

RE: Inspection - Dam #2-6-268-4
Shelburne
Albert Davenport Dam

Dear Mr. Davenport:

On October 21, 1975, an engineer from the Massachusetts Department of Public Works made a visual inspection of the above dam. Our records indicate that you are the owner. Will you please notify this office if this information is not current.

The inspection was made in accordance with Chapter 253 of the Massachusetts General Laws, as amended by Chapter 595 of the Acts of 1970 (Dams-Safety Act).

The results of the inspection indicate that repairs are needed; however, the following changes of conditions have come about since the notice of August 17, 1972 which provides an increased measure of safety downstream:

1. The large beaver dam just upstream has been breached and no impoundment exists at the present time.

2. Considerable siltation of your reservoir has resulted due to the breaching of the beaver dam, thus reducing the impoundment capability.

3. Most of the brush on the upstream slope has been removed.

4. The overflow spillway has been cleaned of debris and brush and the sideslopes regraded.

The following deficiencies were noted:

1. The drawdown gate and controls appear dilapidated; but, you indicated at the time of inspection, that they are operable. General maintenance appears necessary.

2. Remove the growth of brush and trees from the downstream embankment of the dam.

B-10

Subject: Albert Davenport Dam
Shelburne

This is an embankment type structure constructed in 1941 without any plans being submitted to the County Commissioners and altered by the excavation of an earth spillway at the west end to reduce the storage capacity and the head of water so as to avoid falling under the jurisdiction of the County Commissioners. The main embankment is still about 10 feet high, and with beavers' construction of a barrier across the spillway, the storage capacity on occasion easily exceeds several million gallons.

There does not appear to have been much maintenance done on the embankment since it was constructed. There is a heavy growth of brush and small trees on both slopes, so much so that a meaningful inspection of the downstream toe was impractical. There is a swamp in the area between the dam and the Route 2 embankment about 300 feet downstream so leaks and seepage, if present, were not immediately evident.

There is a small embankment carrying a private road across this swamp just outside the Route 2 layout with a 4 foot culvert.

Animal burrows and several washed out areas were observed in the embankment slopes.

There is a drawdown or penstock pipe through the dam at the approximate center with a wooden headworks in poor condition. It appears to be closed with a wooden gate. The condition of this gate is unknown and it is questionable if it is operable.

The spillway on the west end has no controls and is only a swale dug through the embankment about 3 feet deep and 25 feet wide. It is unpaved except for cobblestones and there is a barrier constructed by beavers across it which was breached at the time of this inspection.

Local town officials and owners of downstream properties have complained of sudden increases in the flow of the brook and of flooding of streets and basements in the past. The brook enters a large concrete box culvert through a grating as it crosses Mechanic Street, and debris carried downstream from the pond blocks the culvert causing the brook to overflow with as much as 2 feet of water on Mechanic Street at the Consolidated School.

RCS/agm

DEFICIENCIES NOTED (Cont'd.) -3

Damage to Top or Slope due to Traffic —

Cracked or Damaged Masonry —

Evidence of Piping Unable to check toe; swamp and brush.

Evidence of Seepage Unable to check toe; swamp and brush

Erosion Some portions of embankment had been washed away.

Leaks Unable to check toe downstream -- swamp and brush.

Missing or Inadequate Trash Screens & Rack Yes - See Comments.

Clogged or Blocked Spillways Yes - See Comments

Inadequate Spillways See Comments

Trash and/or Rubbish Available to Impede Flow Yes, Beaver Dam, rubbish, etc.

Condition Favorable for Injury to Public, i.e., Unprotected Penstock Opening, etc.

Other

OVERALL CONDITION: 1. Safe_____ 2. Safe, Minor Repairs Needed_____

3. Conditional Safe, Need Urgent Repairs_____ 4. Unsafe X

REMARKS and RECOMMENDATIONS

See attached sheet.

CS/sd/agm
Att.

B-8

OUTLETS: Locations Spillway North End - Pipe drawdown center.

Spillway - Type Swale through embankment Controlled

Width 25' Height 3' Material Earth & Stone

Emergency Spillway - Available Needed X
Height above Normal Water
Width Height Material

Penstock: Size Unknown Type Pipe

Trickle Tube: Size --

Outlet Controls Available Yes Condition Unknown Automatic

Manual X Needed

Drawdown Device: Present X Needed Condition Unknown - see Comments

Trash Racks, Screens: Present None Condition

Needed Yes - see Comments.

AREA DATA

POND: Area 8¼ Acres Avg. Depth 4 Ft.
Acre Ft. 33
Water Impounded Gals. 10.7 Million

Silt [illegible] Yes X No Approx. Amount Pond ¼

DRAINAGE AREA Sq. M. TYPE: City, Bus. & Ind.

[illegible] Suburban Rural, Farm

Wood & Scrub [illegible] X Slope: Steep X Med. Slight

DOWNSTREAM AREA: Valley Character: Narrow X Wide

Developed Rural 1/3 Urban 2/3

[illegible] NEEDED:

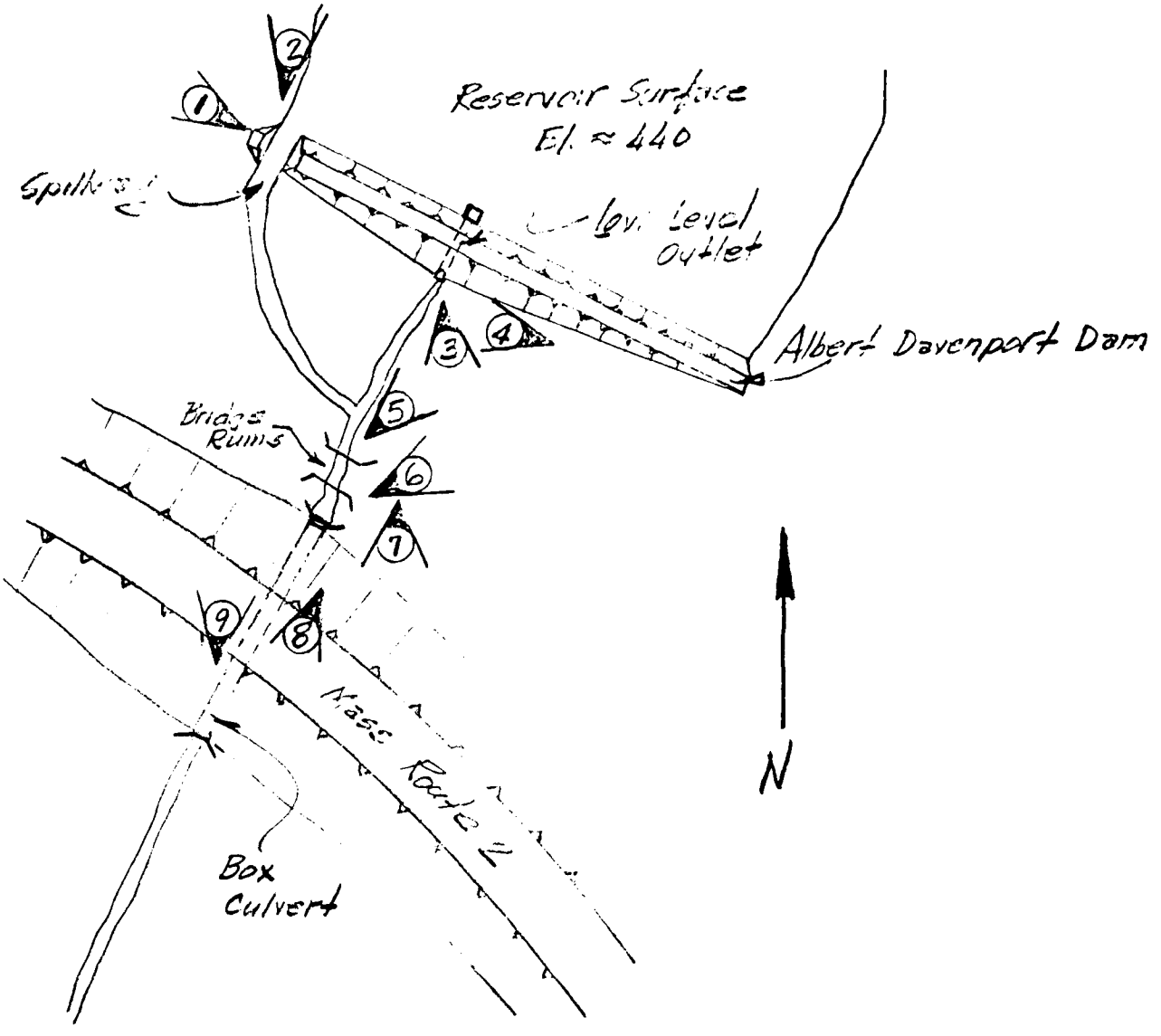
Brush Trees and Brush on Embankment Yes

Brush Fences and Washouts Yes

B-7

O'BRIEN & GERE
ENGINEERS, INC

SUBJECT	SHEET	BY	DATE	JOB NO.
Albert Davenport Dam	A			

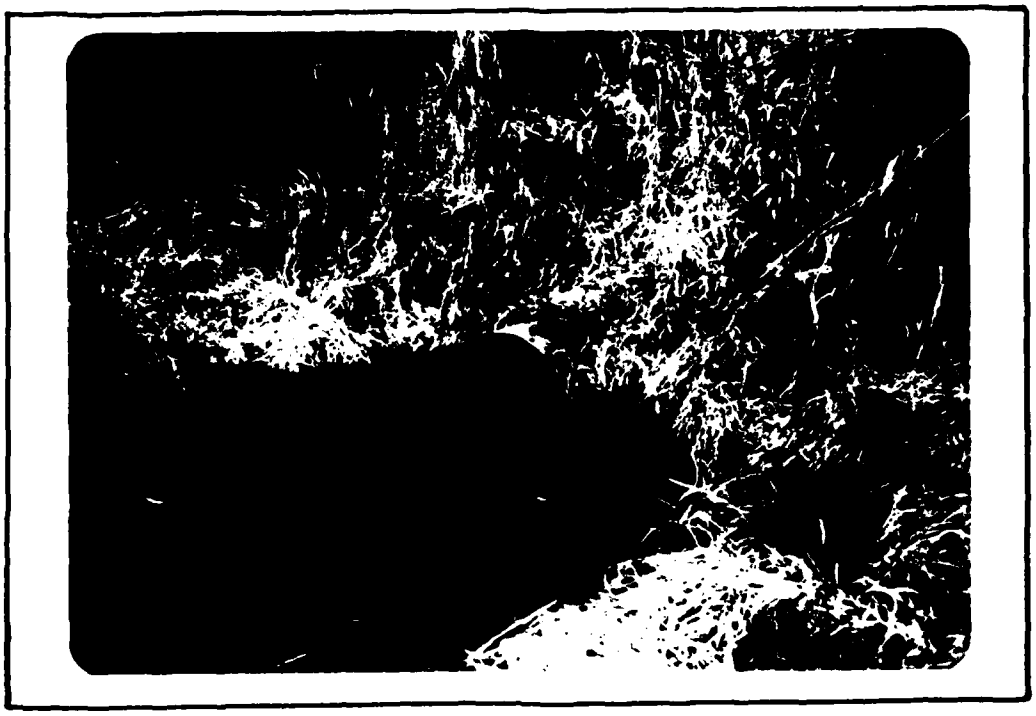


LEGEND ① The location & direction in which each photo was taken and the number of the photo.

SITE PLAN

1. VIEW ALONG CENTER LINE OF DAM FROM THE RIGHT ABUTMENT. (12/2/80)

2. LOOKING DOWNSTREAM THROUGH THE SPILLWAY ADJACENT TO THE RIGHT ABUTMENT. (12/2/80)

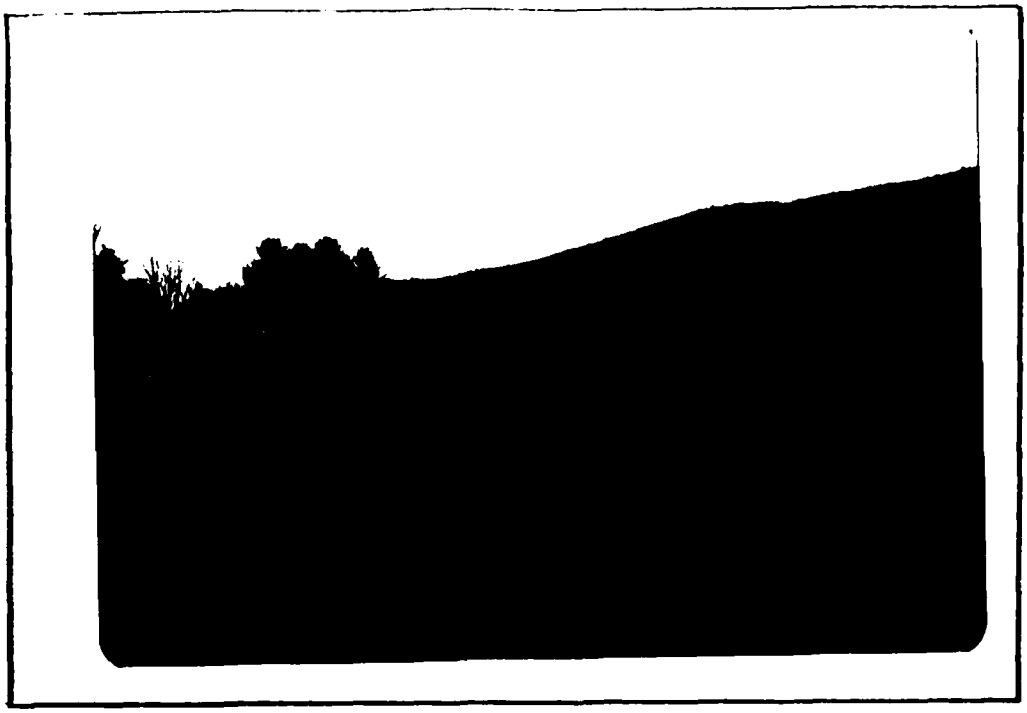


3. OUTLET OF LOW LEVEL DISCHARGE PIPE AT THE DOWNSTREAM TOE OF THE DAM. (12/2/80)

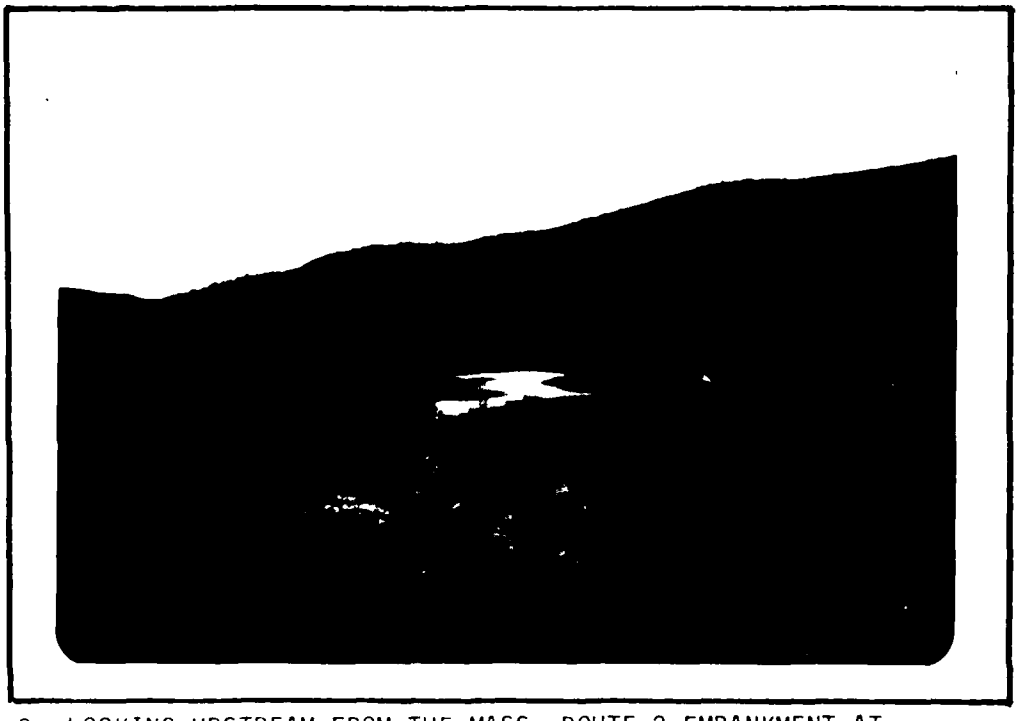
4. SEEPAGE DISCHARGE AT THE DOWNSTREAM TOE OF THE DAM. (12/2/80)

5. RUINS OF FORMER BRIDGE ABOUT 150 FEET DOWNSTREAM OF THE DAM. (12/2/80)

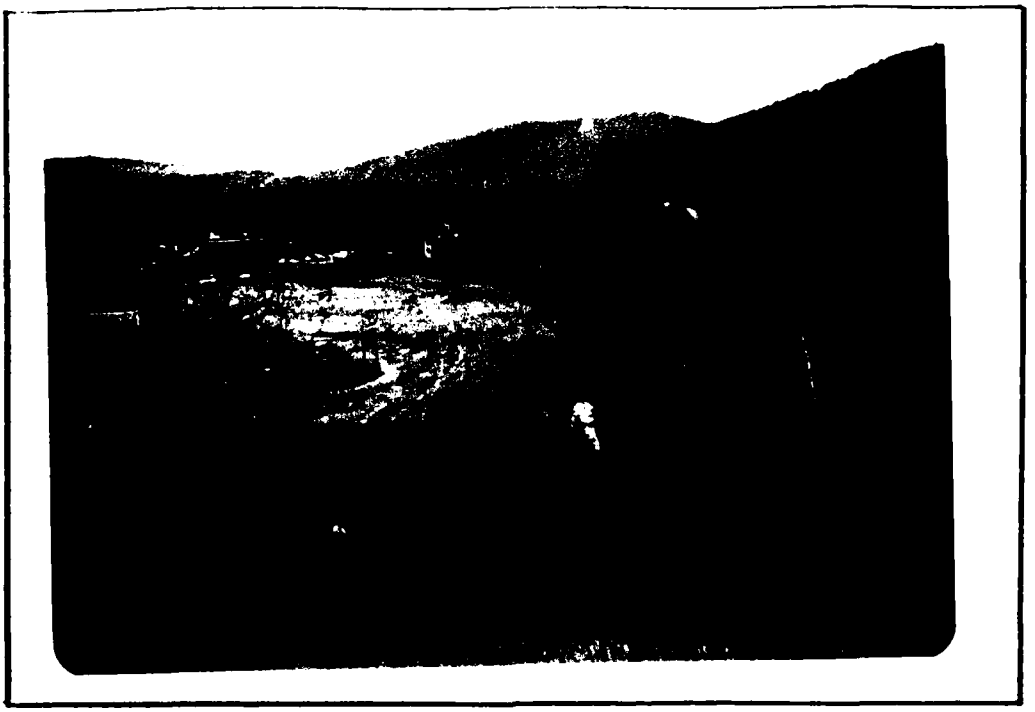
6. MASS. ROUTE 2 CULVERT APPROXIMATELY 200 FEET DOWNSTREAM OF THE DAM. (12/2/80)



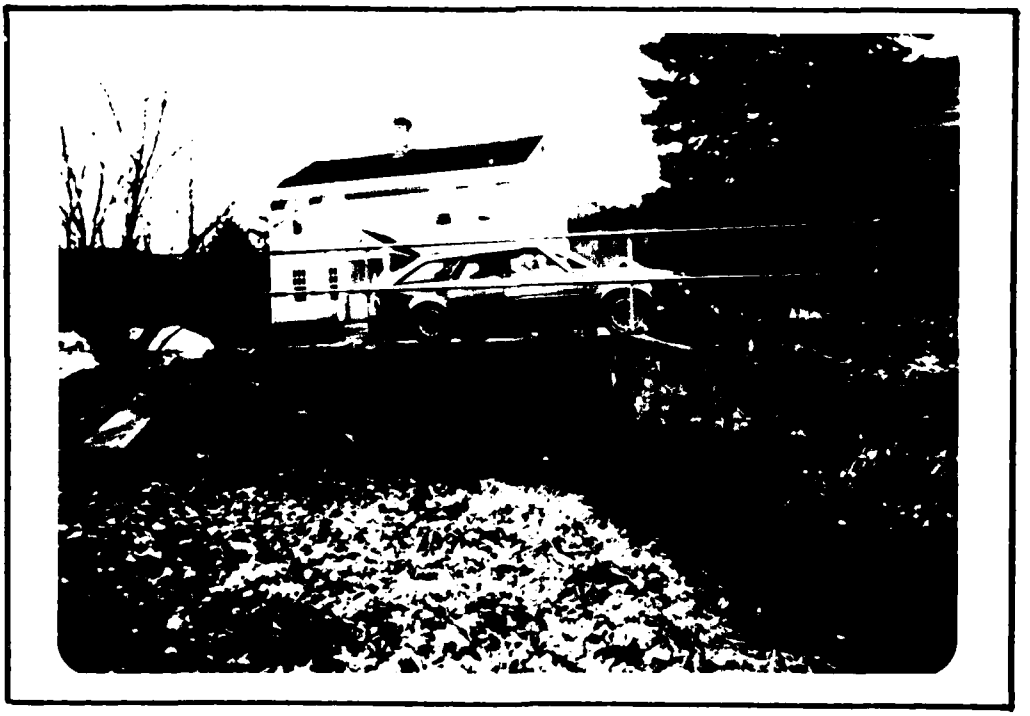
7. STREAM CHANNEL CONDITIONS BETWEEN MASS. ROUTE 2 AND THE DAM. (12/2/80)



8. LOOKING UPSTREAM FROM THE MASS. ROUTE 2 EMBANKMENT AT THE DAVENPORT DAM AND IMPOUNDMENT. (12/2/80)



9. LOOKING DOWNSTREAM FROM THE MASS. ROUTE 2 EMBANKMENT AT THE POTENTIAL DAMAGE AREA. (12/2/80)



10. INLET TO THE BOX CULVERT APPROXIMATELY 1300 FEET DOWNSTREAM OF THE DAM WHICH CONDUCTS THE STREAM UNDER THE TOWN OF SHELBURNE FALLS. (12/2/80)

11. POTENTIAL DAMAGE AREA ABOUT 1000 FEET DOWNSTREAM FROM THE DAM. (12/2/80)

12. OUTLET OF BOX CULVERT WHICH CONDUCTS THE STREAM UNDER THE TOWN OF SHELBURNE FALLS ABOUT 2000 FEET DOWNSTREAM OF THE DAM. (12/2/80)

APPENDIX D

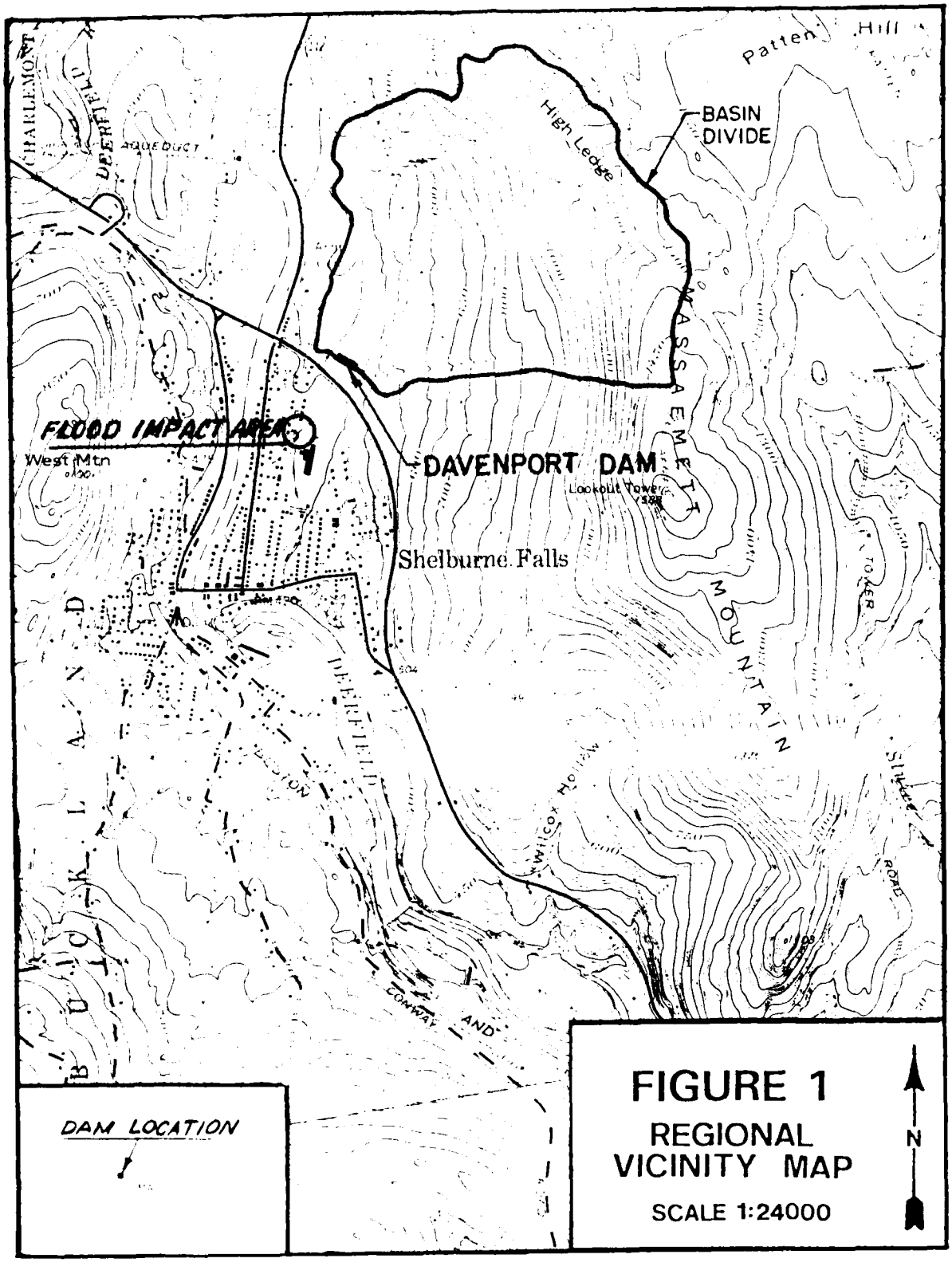
HYDROLOGIC AND HYDRAULIC COMPUTATIONS

ALBERT DAVENPORT DAM

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

TABLE OF CONTENTS


Patten Hill
BASIN DIVIDE
High Ledge
CHARLEMONT
DEERFIELD AQUEDUCT
FLOOD IMPACT AREA
West Mtn
DAVENPORT DAM
Lookout Tower
Shelburne Falls
MASSAEMETT MOUNTAIN
FIRE TOWER
DEERFIELD
Wilcox Hill
SUMMIT ROAD
COMPANY AND
DAM LOCATION
FIGURE 1
REGIONAL VICINITY MAP
SCALE 1:24000
N

BRYANT ASSOCIATES, INC.
648 Beacon Street
BOSTON, MASSACHUSETTS 02215
(617) 247-1800

JOB HILBERT DAVENPORT DAM
SHEET NO. D-2 OF
CALCULATED BY D.H. DATE 12-9-80
CHECKED BY DATE 1/8/81
SCALE

HYDROLOGIC AND HYDRAULIC CALCULATIONS

DRAINAGE AREA	0.64 SQ. MI.		
RESERVOIR AREA	8.50 ACRES	NORMAL POOL	ELEV. 445 ±
RESERVOIR AREA	9.94 ACRES	CREST DAM	ELEV. 448 ±
RESERVOIR AREA	17.94 ACRES		ELEV. 454 ±

TP COMPUTATIONS

L = 1.56 MI.
L_{CA} = 0.60 MI.

SNYDER COEFFICIENTS
C_t = 2.0
C_p = 0.5

$T_L = C_t(L L_{CA})^{0.3} = 2.0(1.56 \times 0.6)^{.3} = 1.96$ HR LAG TIME

PMP DATA

REF. HMS REPORT #33

THE 24 HR. 200 SQ. MI. INDEX RAINFALL IS 20.2 INCHES
6 HR. % = 111
12 HR. = 124
24 HR. = 133

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(617) 247-1800

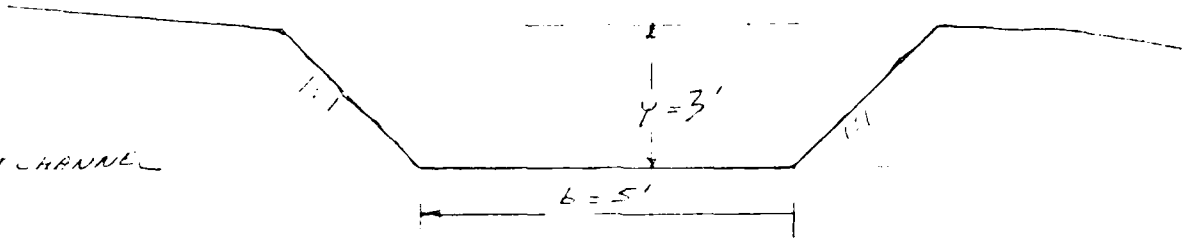
JOB ALBERT DAVENPORT DAM
SHEET NO D-3 OF
CALCULATED BY D.M. DATE 12-9-80
CHECKED BY DATE 1/8/81
SCALE

STAGE - DISCHARGE COMPUTATIONS

SLOPE 7'/250' = 0.02 ft/ft ± OUTLET CHANNEL

$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$

Typical Section for Full Channel Length



n = 0.035
n.v. for channel

$\frac{b + (b+2Y)}{2} \times Y = (b+Y)Y = (5+Y)Y$ n.g.v.

$P = 5 + 2\sqrt{2}Y = 5 + 2.828Y$

$R/P = \frac{(5+Y)Y}{5+2.83Y}$

$= \left[\frac{(5+Y)Y}{5+2.83Y}\right]^{2/3} =$

$\frac{1.49}{.035}\left[\frac{(5+Y)Y}{5+2.83Y}\right]^{2/3} \times S^{1/2}$

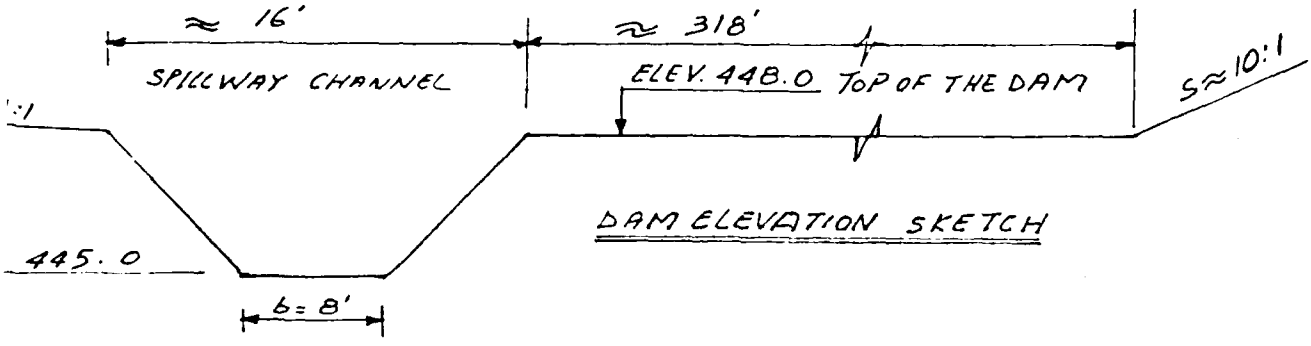
$42.92\left[\frac{5Y+Y^2}{5+2.83Y}\right]^{2/3} \times 0.1414$

$6.069\left(\frac{5Y+Y^2}{5+2.83Y}\right)^{.667}$

ELEV.	A	V	Q_1
445	—	—	—
445.5	2.75	.98	2.7
446	6.0	1.47	8.82
446.5	9.75	1.83	17.94
447	14.0	2.14	29.96
447.5	18.75	2.40	45.00
448	24.0	2.64	63.36

BRYANT ASSOCIATES, INC.
648 Beacon Street
BOSTON, MASSACHUSETTS 02215
(617) 247-1800

JOB ALBERT DAVENPORT DAM
SHEET NO D-4 OF
CALCULATED BY D.M. DATE 12-9-80
CHECKED BY ADH DATE 2/27/81
SCALE



DAM ELEVATION SKETCH

= DISCHARGE ON TOP OF THE DAM

$Q_D = 2.7 L \times H^{1.5}$

$Q_D = 2.7 \times (318+16) H^{1.5} = 901.8 H^{1.5}$

V. 448 $H = 0$ $Q_D = 0$
448.5 $H = .5$ $Q_D = 319$ CFS
449. $H = 1$ $Q_D = 902$ "

Q_1 = DISCHARGE OF SPILL WAY
Q_D = DISCHARGE ON TOP OF THE DAM
Q_2 = FLOW THROUGH 8'x7' CULVERT under Route-2

Q_C = Flow at appropriate Control Structure

GE-DISCHARGE TABLE

(page D-5 for S.D & S-S curves)

D	Q_1 CFS	Q_D CFS	Q_2 CFS	Q_T
.	—			—
.5	3			3
;	9			9
.5	18			18
7	30			30
7.5	45			45
8	63	—		63
8.5	↳	319		319
9		↳	800	800
0			832	832
1			880	880
2			928	928
3			968	968
4			1000	1000

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648 Beacon Street
BOSTON, MASSACHUSETTS 02215
(617) 247-1800

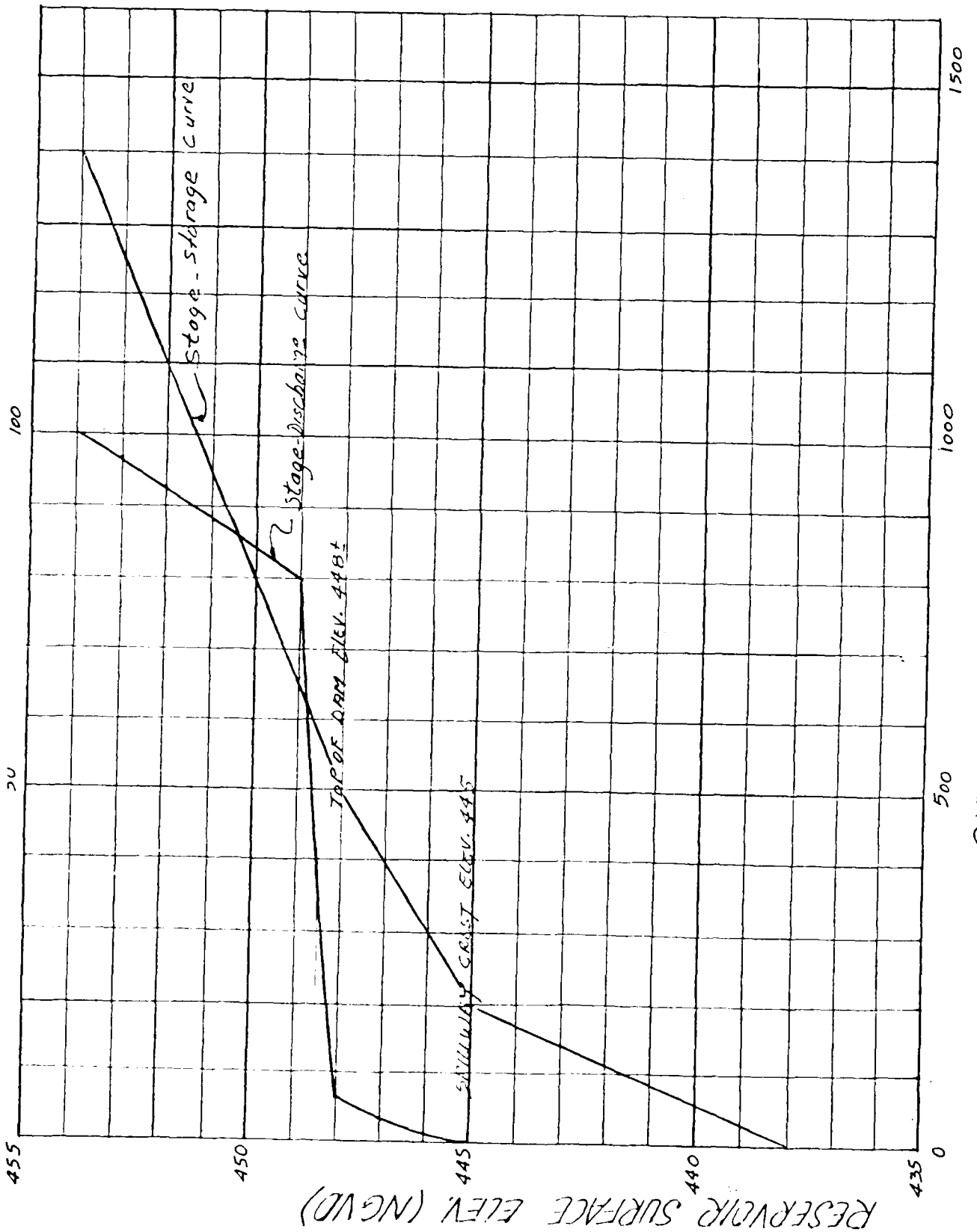
JOB ALBERT DAVENPORT DAM

SHEET NO D-5 OF

CALCULATED BY D.M. DATE 12-10-80

CHECKED BY DATE

SCALE



SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	[illegible]	[illegible]	[illegible]
STORAGE	[illegible]	[illegible]	[illegible]
OUTFLOW	[illegible]	[illegible]	[illegible]

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
[illegible]	4[illegible].04	.54	2.	1176.	.75	20.00	0.00

PLAN 2 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	423.10	423.10	427.50
STORAGE	0.	0.	1.
OUTFLOW	3.	3.	298.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.05	425.05	0.00	0.	82.	0.00	19.75	0.00

[illegible] AT	[illegible]	.64	1	126.
		1.[illegible]		[illegible]
				1.[illegible]
				[illegible]
ROUTED TO	Outflow	.64	1	114.
		1.667		32.51(
			2	81.
				2.29(
ROUTED TO	CHANNL	.64	1	1131.
		1.667		1.63(
			2	82.
				2.32(
ROUTED TO	OUTFL	.64	1	1170.
		1.667		33.14(
			2	82.
				2.33(

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	445.00	445.00	448.00
STORAGE	20.	20.	50.
OUTFLOW	0.	0.	63.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.09	448.02	.02	51.	1155.	.40	19.92	19.75

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	445.00	445.00	448.00
STORAGE	20.	20.	50.
OUTFLOW	0.	0.	63.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.09	448.04	.04	51.	81.	1.25	19.75	0.00

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0500	.0300	.0500	425.0	450.0	750.	.01000

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
50.00 450.00 125.00 440.00 4[illegible].00 431.00 540.00 430.00 650.00 426.00
700.00 430.00 7[illegible].00 433.00 900.00 440.00

STORAGE	0.00	.21	.82	1.85	5.44	12.83	21.81	32.22	44.03	57.25
	71.83	87.92	104.85	122.00	139.35	156.91	174.68	192.55	210.83	229.21
OUTFLOW	0.00	43.31	274.92	810.71	1619.64	5991.02	12761.67	21898.73	33407.56	47346.04
	63787.25	82312.22	105865.58	131569.33	159695.07	190163.34	222909.66	257880.66	295031.54	334324.24
STAGE	425.00	427.25	428.53	429.79	431.05	432.32	433.58	434.84	436.11	437.37
	438.63	439.89	441.16	442.42	443.68	444.95	446.21	447.47	448.74	450.00
FLOW	0.00	43.31	274.92	810.71	1619.64	5991.02	12761.67	21898.73	33407.56	47346.04
	63787.25	82312.22	105865.58	131569.33	159695.07	190163.34	222909.66	257880.66	295031.54	334324.24

MAXIMUM STAGE IS 430.3

MAXIMUM STAGE IS 4[illegible]

HYDROGRAPH ROUTING

ROUTED OUTFLOW TO MECHANIC STREET

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
OUTLE	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME
ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-423.	-1

STAGE	423.00	424.00	42[illegible].00	429.00	430.00	431.00	432.00
FLOW	0.00	5[illegible].00	175.00	296.00	939.00	7100.00	15200.00

SURFACE AREA=	[illegible]	[illegible]	[illegible]
CAPACITY=	[illegible]	[illegible]	[illegible]
ELEVATION=	423.	430.	435.

CREL	SPWID	COQW	EXPW	ELEVL	COOL	CAREA	EXPL
423.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
429.5	0.0	0.0	0.

PEAK OUTFLOW IS [illegible] AT TIME [illegible] HOURS

PEAK OUTFLOW IS [illegible] AT TIME 1[illegible] HOURS

ROUTING DATA

	1	0	0	0	0	1	0	0

ROUTING DATA

	1	1	0	0		0

1	0	0	0.000	0.000	0.000	-445.	-1

444.00	446.00	447.00	448.00	448.50	449.00	450.00	451.00	452.00	453.00
454.00									
0.00	9.00	30.00	63.00	319.00	800.00	832.00	880.00	928.00	963.00
1000.00									
AREA- 0.	9.	12.	18.						
CAPACITY- 0.	20.	50.	140.						
ELEVATION- 438.	445.	448.	454.						

445.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

445.0	0.0	0.0	0.

DAM BREACH DATA

127.	.01	440.00	1.00	445.00	448.00

DAM BREACH DATA

127.	.01	440.00	1.00	445.00	450.00

HYDROGRAPH ROUTING

CHANNEL ROUTING TO HAZARD AREA

	1	0	0	0	0	1	0	0

ROUTING DATA

	1	1	0	0		0

1	0	0	0.000	0.000	0.000	1.	0

D-16

```
HYDROLOGIC ANALYSIS OF ALBERT DAVENPORT DAM BREACH
      NATIONAL DAM INSPECTION PROGRAM
   NEW ENGLAND DIVISION  CORPS OF ENGINEERS

                    JOB SPECIFICATION
  NQ     NHR    NMIN   IDAY    IHR   IMIN  METRC  IPLT  IPRT  NSTAN
 300       0      15      0      0      0      0     0     0      0
                       JOPER   NWT  LROPT  TRACE
                          5      0      0      0

            MULTI-PLAN ANALYSES TO BE PERFORMED
               NPLAN= 2 NRTIO= 1 LRTIO= 1
  RTIOS=   .0?

 **********   **********   **********   **********   **********

                SUB-AREA RUNOFF COMPUTATION

        INFLOW TO ALBERT DAVENPORT POND

        ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
        INFLOW      0       0       0      0      0      1      0      0

                      HYDROGRAPH DATA
  IHYDG   IUHG   TAREA   SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
      1      1     [illegible]   0.00   [illegible]    0.00   0.000       0       1       0

                      PRECIP DATA
         [illegible]    [illegible]   [illegible]    R12    R24    R48    R72    R96
        [illegible]  [illegible]  111.[illegible]  [illegible]  [illegible]   [illegible]   [illegible]   0.00
 [illegible] ... 15 [illegible]

                      LOSS DATA
  [illegible]  [illegible]  [illegible]  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
         [illegible]  [illegible]  0.00   0.00   1.00   0.00    .05   0.00   0.00

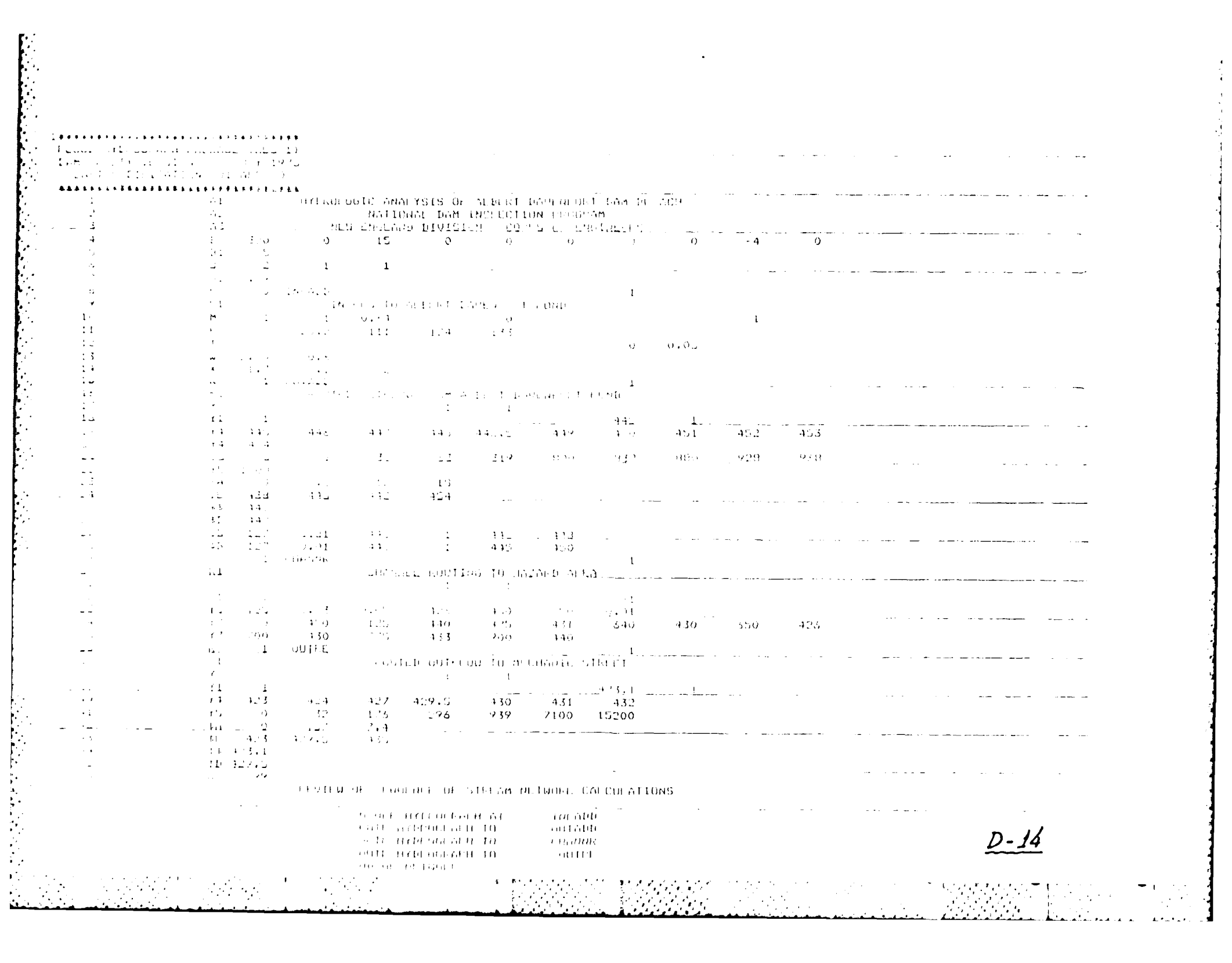
                  UNIT HYDROGRAPH DATA
              TC=  2.00    LAG=  [illegible]   NTA= 0

                   RECESSION DATA
          [illegible]   [illegible]   [illegible]   [illegible]   RTIOR= 2.00

 UNIT HYDROGRAPH [illegible] END OF PERIOD ORDINATES, LAG=  2.01 HOURS, CP=  .61  VOL= 1.00
     [illegible]   [illegible]   [illegible]   85.   105.   119.   126.   125.   115.
     [illegible]   [illegible]   52.   51.   [illegible]   42.   32.   32.   32.
     [illegible]

                  END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS  COMP Q   MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS  COMP Q

                          [illegible]
                          [illegible]
```



D-14

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1 .05	RATIO 2 .09	RATIO 3 .10	RATIO 4 .30	RATIO 5 .50	RATIO 6 .75	RATIO 7 .80	RATIO 8 .90	RATIO 9 1.00
HYDROGRAPH AT	INFLOW	.64	1	71.	128.	143.	428.	713.	1069.	1141.	1283.	1426.
		1.66)	(	2.02)(	3.63)(	4.04)(	12.11)(	20.19)(	30.28)(	32.30)(	36.34)(	40.37)
ROUTED TO	OUTFLOW	.64	1	31.	81.	110.	427.	711.	880.	910.	967.	1022.
		1.66)	(	.87)(	2.29)(	3.13)(	12.08)(	20.13)(	24.91)(	25.78)(	27.37)(	28.93)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	445.00	445.00	448.00
STORAGE	20.	20.	50.
OUTFLOW	0.	0.	93.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.05	445.67	0.00	32.	31.	0.00	20.50	0.00
.09	446.01	.01	41.	81.	1.25	19.25	0.00
.10	446.09	.09	52.	110.	2.25	19.00	0.00
.30	446.61	.61	98.	427.	7.50	17.25	0.00
.50	446.91	.91	82.	711.	10.25	17.25	0.00
.75	447.22	1.22	91.	880.	12.75	18.25	0.00
.80	447.28	1.28	100.	910.	13.00	19.00	0.00
.90	447.39	1.39	114.	967.	13.25	19.25	0.00
1.00	447.50	1.50	128.	1022.	13.25	19.25	0.00

D-13

SUB-AREA RUNOFF COMPUTATION

INFLOW TO ALBERT DAVENPORT POND

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
ISTAQ	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	.64	0.00	.64	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	20.20	111.00	124.00	133.00	0.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .900

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 2.00 CP= .60 NTA= 0

RECESSION DATA

STRTQ= -1.70 QRCSN= -.10 RTIOR= 2.00

UNIT HYDROGRAPH 47 END OF PERIOD ORDINATES, LAG= 2.01 HOURS, CP= .61 VOL= 1.00

[illegible]	19.	[illegible]	51.	[illegible]	105.	119.	126.	125.	115.
[illegible]	39.	[illegible]	59.	51.	[illegible]	47.	42.	37.	32.
[illegible]	25.	22.	20.	[illegible]	[illegible]	15.	12.	10.	9.
[illegible]	7.	[illegible]	6.	[illegible]	4.	4.	3.	3.	3.
[illegible]	2.	[illegible]	2.	1.	1.	1.			

END OF PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

SUM 21.49 20.29 1.20 34235.
(546.)(515.)(30.)(969.43)

HYDROGRAPH ROUTING

ROUTED OUTFLOW FROM ALBERT DAVENPORT POND

ISTAR	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
0	1	0	0	0	0	1	0	0

ROUTING DATA

RSVRS	CLOSS	AVG	IRES	ISAME	IOPT	IEMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTPN	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	445.	-1

STAGE	445.00	446.00	447.00	448.00	449.00	450.00	451.00	452.00	453.00
FLOW	0.00	9.00	30.00	82.00	319.00	800.00	812.00	880.00	928.00	968.00
SURFACE AREA	0.	9.	12.	18.					
CAPACITY	0.	20.	50.	140.					
ELEVATION	100.	110.	120.	151.					

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
445.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
448.0	0.0	0.0	0.

YEAR OUTFLOW IS 31. AT TIME 20.50 HOURS

YEAR OUTFLOW IS 21. AT TIME 17.75 HOURS

YEAR OUTFLOW IS 110. AT TIME 19.00 HOURS

YEAR OUTFLOW IS 127. AT TIME 17.75 HOURS

YEAR OUTFLOW IS 211. AT TIME 17.75 HOURS

YEAR OUTFLOW IS 200. AT TIME 18.25 HOURS

YEAR OUTFLOW IS 310. AT TIME 19.00 HOURS

YEAR OUTFLOW IS 184. AT TIME 17.25 HOURS

YEAR OUTFLOW IS 1022. AT TIME 19.25 HOURS

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1******************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  01 APR 80
 ******************************
            A1              HYDROLOGIC ANALYSIS OF ALBERT DAVENPORT DAM
            A2                 NATIONAL DAM INSPECTION PROGRAM
            A3               NEW ENGLAND DIVISION - CORPS OF ENGINEERS
            B     300       0      15       0       0       0       0       0      -4       0
            B1      5
            J       1       9       1
            J1    .05     .09     0.1     0.3     .50     .75      .8      .9     1.0
            K       0  INFADD                                       1
            K1             INFLOW TO ALBERT DAVENPORT POND
            M       1       1    0.64               0                               1
            P       0    20.2     111     124     133
            T                                                       0    0.05
            W    2.00     0.6
            X    -1.7    -0.1       2
            K       1  OUTADD                                       1
            K1            ROUTED OUTFLOW FROM ALBERT DAVENPORT POND
            Y                       1               1
            Y1      1                                            -445      -1
            Y4    445     446     447     448   448.5     449     450     451     452     453
            Y5      0       9      30      63     319     800     832     880     928     968
            $A      0     8.5      12      18
            $E    438     445     448     454
            $$    445
            $D    448
            K      99
1                    PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                          RUNOFF HYDROGRAPH AT        INFADD
                          ROUTE HYDROGRAPH TO         OUTADD
                          END OF NETWORK


                       HYDROLOGIC ANALYSIS OF ALBERT DAVENPORT DAM
                          NATIONAL DAM INSPECTION PROGRAM
                        NEW ENGLAND DIVISION - CORPS OF ENGINEERS

                                     JOB SPECIFICATION
           NQ      NHR     NMIN     IDAY      IHR     IMIN    METRC     IPLT     IPRT    NSTAN
          300        0       15        0        0        0        0        0        4        0
                                   JOPER      NWT    LROPT    TRACE
                                       5        0        0        0

                                 MULTI-PLAN ANALYSES TO BE PERFORMED
                                   NPLAN= 1  NRTIO= 9  LRTIO= 1
             RTIOS     .05     .09     .10     .50     .50     .75     .80     .90    1.00
```

BRYANT ASSOCIATES, INC.
648 Beacon Street
BOSTON, MASSACHUSETTS 02215
(617) 247-1800

JOB ALBERT DAVENPORT DAM
SHEET NO D-9 OF
CALCULATED BY D.M DATE 12-22-80
CHECKED BY DATE
SCALE

Discharge Computations for Mechanic St.

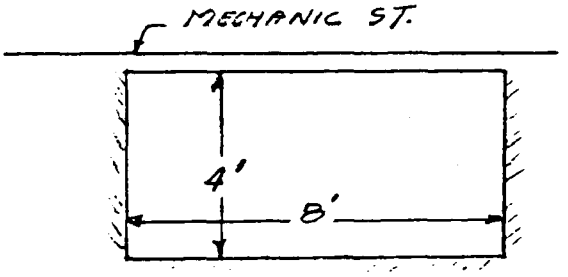
Box Culvert Q_c computed according Chart on Page 498 OPEN CHANNEL HYDRAULIC VEN T. CHOW

Q_c = Discharge Through Box culvert 8'X4'

ELEV. (NGVD)	Q_c	Q_M
424	32	—
427	176	—
429.5	296	—
430	309	939
431	312	7100
432	349	1520

Q_M = DISCHARGE OVER MECHANIC ST
$Q_M = 2.7 L_x H_x^{1.5}$
L_x = Length at different ELEVATION
H_x = Height at different ELEVATION

ELEV. 429.5 $L_1 = 0$ $h_1 = 0$
ELEV. 430. $L_2 = 335$ $h_2 = 0.5$
ELEV. 431 $L_3 = 1366$ $h_3 = 1.5$
ELEV. 432 $L_4 = 1393$ $h_4 = 2.5$



STAGE - STORAGE - MECHANIC ST

ELEV (NGVD)	AREA (ACRES)	STORAGE (ACRE-FEET)
423	0	0
430	0.57	1
435	7.40	20

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JOB Albert Davenport Dam
SHEET NO D-8 OF
CALCULATED BY D.M. DATE 12-22-80
CHECKED BY DATE 1/8/81
SCALE

Discharge Computations for Mechanic St.

Box Culvert

Q_c Computed according to Chart on Page 498 OPEN CHANNEL HYDRAULIC V.T. CHOW

ELEV. NGVD	424	427	430	432	433	434	435	* 429.5
Q_c	32 cfs	176	304	344	384	400	424	296

BROAD CRESTED WEIR $Q = 2.7 L H^{1.5}$

ELEV. 429.5 $L_1 = 0$ ELEV. 430 $L_2 \approx 335'$ ELEV. 435 $L_3 \approx 1475'$

ELEV. NGVD	Q L_1	Q L_2	Q L_3	Q_c	Q TOTAL
424	—	—	—	32	32
427	—	—	—	176	176
429.5	0	—	—	296	296
430	—	635		304	939
435	—	—	9600	424	≈10,000

STAGE STORAGE — MECHANIC ST.

ELEV. NGVD	AREA (ACRES)
423	0
430	0.57
435	7.40

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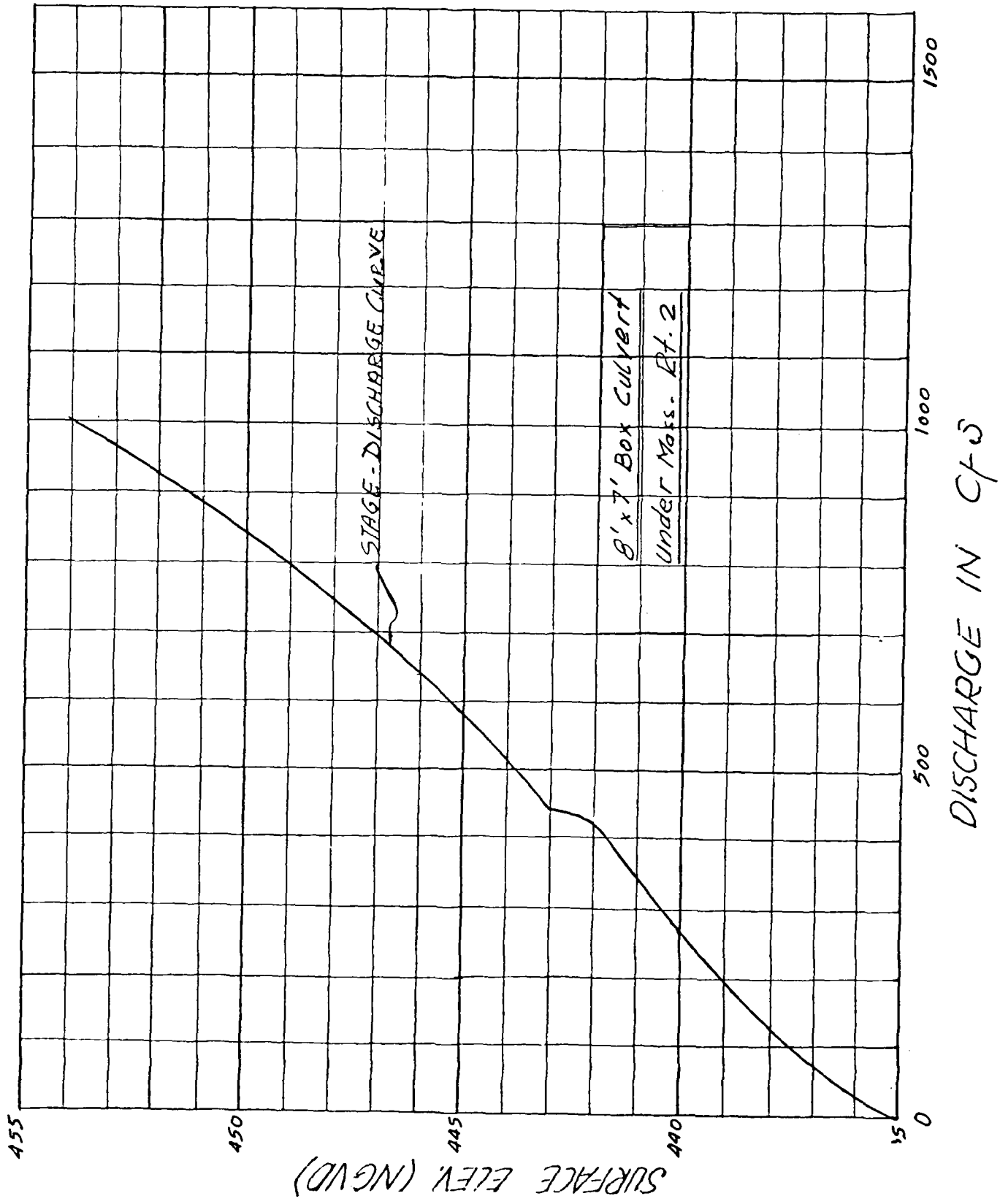
(617) 247-1800

JOB ALBERT DAVENPORT DAM
SHEET NO D-7 OF
CALCULATED BY D.M. DATE 2-19-81
CHECKED BY DATE
SCALE



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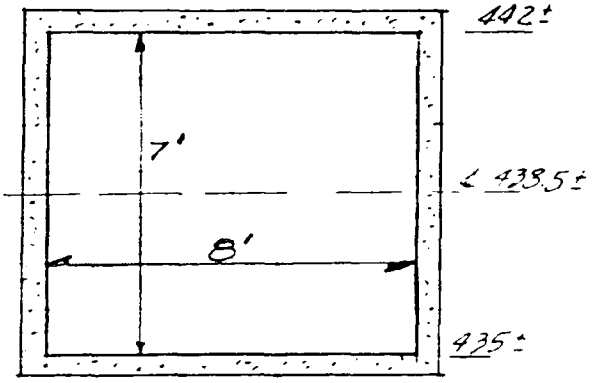
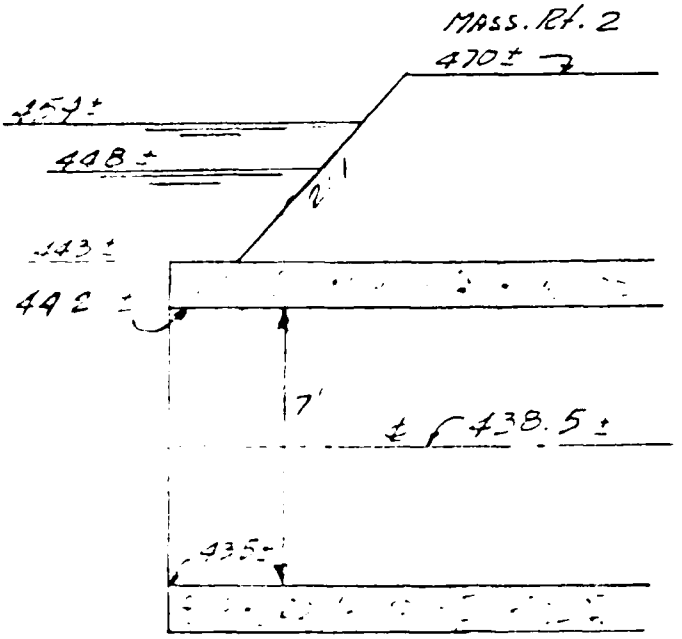
JOB ALBERT DAVENPORT DAM
SHEET NO D-6 OF
CALCULATED BY D.M. DATE 12-9-80
CHECKED BY ADH DATE 2/27/81
SCALE

DISCHARGE THRU MASS. Rt. 2 CULVERT COMPUTATIONS:



ELEVATION
(Looking Downstream)

NO SCALE:



PROFILE

STAGE DISCHARGE TABLE

ELEV. (NGVD)	HEAD	Q_2 (cfs)
435.0	0	0
436.31	1.31	36
437.63	2.63	102
438.87	3.87	181
440.07	5.07	267
441.25	6.25	358
442.0	7.00	424
443.0	4.5	440
444.0	5.5	520
446.0	7.5	640
448.0	9.5	752
449.0	10.5	800
450.0	11.5	832
451.0	12.5	880
452.0	13.5	928
453.0	14.5	968
454.0	15.5	1000

FORMULAS:

1.) El. 435 to El. 442 - Open channel flow was computed according to the MANNING formula

$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$

- Where $S \approx 0.01$ ft/ft $A = 8h_1$ ft^2
$n \approx 0.02$ h_1 = depth of flow
- Also, an entrance loss equal to ½ of the velocity head was assumed at the inlet.

2.) El. 442 To El. 454: Inlet control was assumed to govern culvert discharge. Flows were obtained from a discharge nomograph included in Highway Engineering Circular No 5 prepared by the Bureau of Public Roads.

END

FILMED

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